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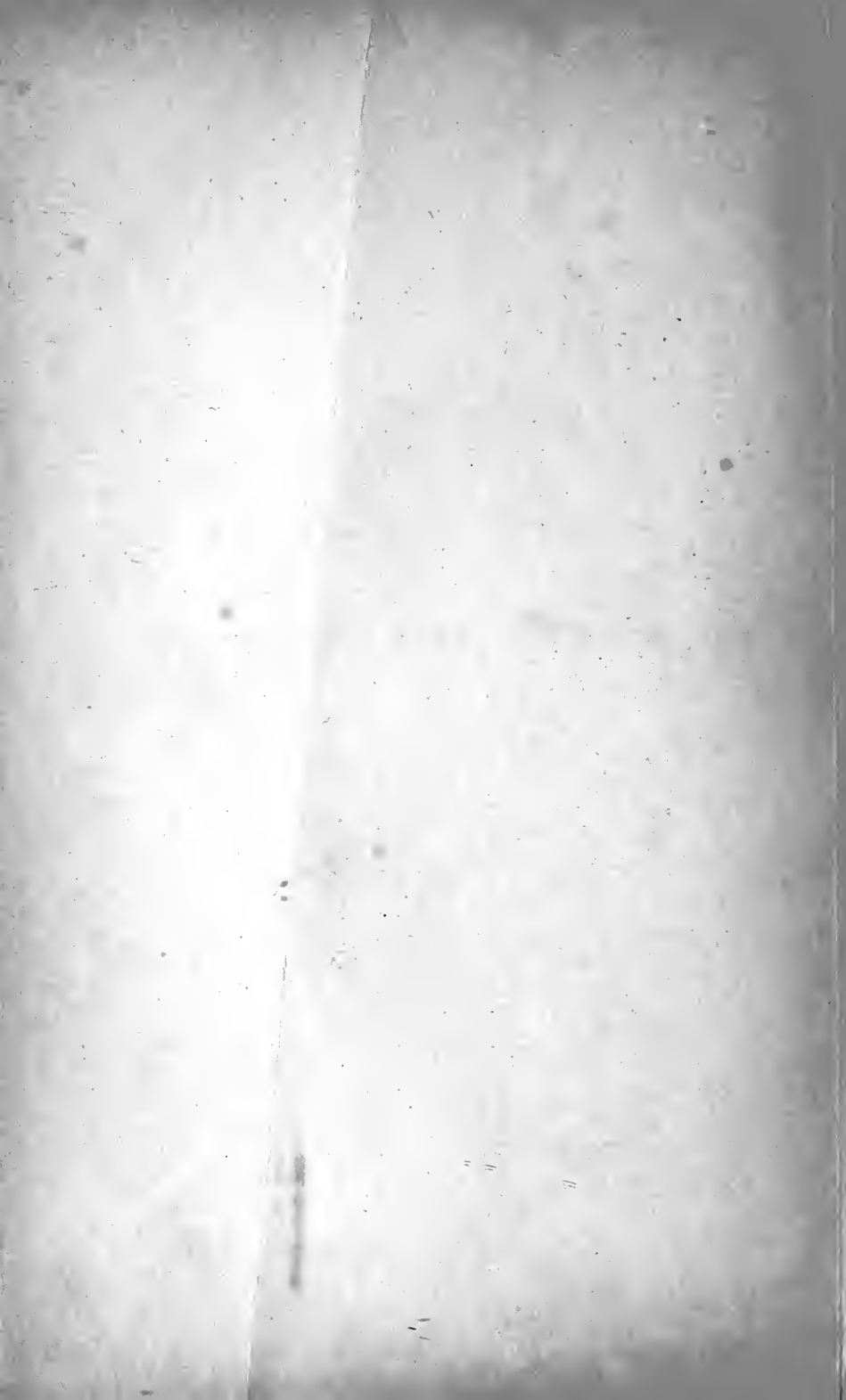
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THE INTERNATIONAL GEOGRAPHY



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By Seventy Authors

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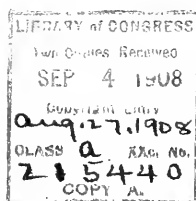
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BRISBANE AND PHILADELPHIA

NORTH AMERICA, CENTRAL AMERICA,
AND THE WEST INDIES

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PREFACE

IN presenting this section of the *International Geography* for use in schools or private study, I desire to urge the necessity for the constant use of a good atlas, containing, if possible, physical as well as "political" maps. The small maps given in the text serve only to concentrate attention on certain important points, and by no means take the place of an atlas.

The teacher interested in his work will not fail to develop the diagrammatic treatment of statistics, and guard his pupils against the delusion that there is any virtue in remembering exact figures of population, or of trade, or of other matters which are constantly changing.

It is a good plan to encourage drawing and colouring the flags of the different countries correctly, and to use the flag as the symbol of the country whenever it is possible to do so. An incident which occurred on the landing of King Edward VII. at Lisbon on an official visit might well be remembered. A strip of carpet laid on the muddy quay proved too short, and was supplemented at the last moment by a large Portuguese flag: when the King came to the flag of the country he was visiting, he stepped off in the mud rather than trample upon it. The recognition of the flag as the highest expression of the individuality of a country has led to the introduction in the text of numerous illustrations of flags and colonial badges.

It is worth suggesting to teachers the preparation of an illustrated geography of the greatest interest by gradually forming an album of picture post-cards, each card being selected to show some characteristic view or scene. Most picture post-cards would be rejected, but the few retained would be found of permanent value.

The questions added at the end (for the compilation of which I am indebted to Mr. G. F. Bosworth) are intended to serve as guides to the teacher, and to suggest further questions which he may frame, and problems which may be set and solved from the data given in the pages. While I venture to hope that both teachers and pupils exist in increasing numbers who enjoy the study of geography on account of its inherent interest, the specimen questions, copied from various examination papers of the modern type, may direct the attention of others less happily gifted

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to ways of viewing the subject, which, even if unattractive, may be of service.

The special feature of the *International Geography* is that the description of each country is not only prepared according to a uniform plan embodying the principles of geography, but it is the work of a high authority, and in most cases of a native or long resident in the country described. Next to a thorough knowledge of the British Isles and the outlying parts of the British Empire, from the standpoint of a British subject, proud of the progress and achievement of all the Britains, it seems to me that a sound knowledge of other countries, as they are known to their own people from within, is of the highest importance in teaching ourselves our true position among the countries of the world. The *International Geography* is designed with that aim in view.

The work has been carefully revised, and in carrying out the revision, I have gladly availed myself of the assistance of many friendly critics in all countries.

I have to acknowledge with special thanks the skilled advice and generous help of my old friend, Mr. R. A. Gregory, in making the necessary arrangements for publishing the greater part of the volume in separate and independent sections of a convenient size for use in schools.

H. R. M.

62 CAMDEN SQUARE, LONDON, N.W.

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NORTH AMERICA, CENTRAL AMERICA,
AND THE WEST INDIES

BOOK IV.: NORTH AMERICA

CHAPTER XXXVII.—THE CONTINENT OF NORTH AMERICA.

BY WILLIAM MORRIS DAVIS,

Professor of Physical Geography in Harvard University.

Resemblances between North and South America.—The number of continents interrupting the great ocean is so small that it is difficult to determine what are essential and what are unessential continental features. The overgrown land area of Eurasia and the small continent of Australia are so unlike in structure and form that no just comparison can be drawn between them without straining the slight resemblance of parts that are imagined to correspond with one another. If all the continents were as much alike as North and South America, the problem would be much simpler. Here distinct resemblances with an assured basis in geological history may be discovered ; and perhaps for this reason the repeated features of these two land masses are often taken as the essential features of continental form.

In a very general way, the two Americas each have a greater belt of mountainous highlands along their western side ; and two lesser highlands on the north-east and south-east. The greater highlands include many volcanic cones and lava sheets, and intermont basins ; and the drainage of the latter frequently fails to reach the sea. Eruptive and mountain-making disturbances have here been in operation in relatively recent geological periods. The lesser highlands owe their deformed structures to ancient disturbances, although their present altitude above sea-level may have been gained by uplift at a comparatively modern date in the Earth's history. North-east of each of the north-eastern highlands lies an archipelago ; but the islands of the two archipelagoes are very unlike in size and origin. Between the western and eastern highlands lies an extensive belt of plains at a moderate altitude above the sea-level, and with ill-defined divides between the chief river systems. The Mackenzie and Orinoco flow northward, the St. Lawrence and Amazon flow eastward, and the Mississippi and La Plata flow southward.

Contrasts between North and South America.—Although differing in a host of minor details, these large resemblances serve to establish true continental homologies ; but their value would be lost if the comparison were pressed too far. The most important points of con-

trast result from the situation of North America chiefly in the north temperate zone, while South America has its greatest width in the torrid zone. The Arctic archipelago includes one of the two great glacial sheets now existing ; and its shores are bound by the ice foot every winter. The West Indies rise through warm ocean currents into the warm trade winds; their largest island bears elevated coral reefs, and living coral reefs border many of their shores. The freezing waters of Baffin and Hudson bays and the cold Labrador current that they give forth have no likeness in the "caldrons" of the Caribbean Sea and the Gulf of Mexico, or in the warm current that flows from them: Under the severe climate of the far north the lichens and mosses of the "barren lands" west of Hudson Bay, and the coniferous forests of the inhospitable uplands of Labrador have little likeness to the grassy llanos of the Orinoco and luxuriant tropical forests of Guiana. The direct and indirect results of glaciation, so pronounced in North America, include features so important as the Great Lakes of the St. Lawrence system, for which the Amazon, under the equatorial rain belt, has no parallel. Tropical North America, with mangroves and coral reefs along its shores, malaria on its coastal lowlands, and an agreeable climate on its plateaux, forms a striking contrast to the narrowing southern extremity of South America, whose inclement climate illustrates the real character of the misnamed "south temperate zone."

Resemblances between North America and Eurasia.—A comparison may be drawn between North America and Eurasia in which climatic as well as structural and topographical features have certain striking resemblances ; but here the repetition is like that of the two hands, Eurasia being on the right and North America on the left of the axis of symmetry. The correspondence extends to so many structural features that it has been an embarrassment to the science of geology, by giving some basis for the belief that all the world was made on the pattern which north-eastern North America so largely duplicates from Europe. The Laurentian highlands correspond to Scandinavia and Finland ; composed of very ancient and greatly denuded rocks, highest and deeply fjorded on the Atlantic side, decreasing in altitude inland, and lately (as the Earth views time) depressed and submerged in Hudson Bay and the Gulf of Bothnia. Newfoundland and the Maritime Provinces, with the adjacent shallow ocean waters on the fishing grounds of the Banks, may be paired with Great Britain and Ireland, and the shallow waters of the continental shelf there adjoining. The St. Lawrence system, from its broad gulf to the great lakes is represented by a more submerged belt from the North Sea through the Baltic to the Gulf of Finland ; while the extensive lakes further north in Canada are represented by the larger lakes of north-western Russia. The Appalachians, with their basins of deformed coal measures stretching from Nova Scotia to Alabama, may be likened to an ancient coal-bearing mountain system of similar date, which extends from Wales across Belgium and far eastward into Germany. From the

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Laurentian and Scandinavian highlands, extensive ice sheets have spread over the adjacent lands in geologically recent times ; advancing chiefly south and south-westward in North America, and south and south-eastward in Europe ; leaving the land dotted with lakes, and creating new landscapes in the heavy drift deposits left on the peripheral areas (Figs. 52 and 329). The fertile prairies of the Ohio and upper Mississippi basin and further north to Winnipeg, underlain by widespread Palæozoic formations, correspond to the Russian plains of horizontal Palæozoic strata. The treeless plains formed largely by Cretaceous and Tertiary sediments, slowly ascending towards the base of the Rocky Mountains, match the Asiatic steppes of Tertiary deposits, slowly ascending towards the great mountain chains of central Asia. In both these regions of great horizontal extent and small vertical relief, the rainfall decreases with distance from the Atlantic, and the innermost districts are sub-arid or desert. Not until the massive mountain chains of central Asia are reached can we find the homologue of the western mountainous highlands of North America.

East Coast.—The coast lines of North America offer many illustrations of the manner in which relatively slight movements of elevation or depression of a continental mass cause important changes in its boundary, and introduce peculiar controls over the occupations of its inhabitants. From New England north and west nearly to the mouth of the Mackenzie river, the land now stands somewhat lower than its average position during a considerable part of Tertiary time ; hence the coast is generally bold and rocky, many deep bays indent the land, outlying islands stand off shore, and the submerged lowlands broaden the continental shelf. The Gulf of Maine with its branch into the Bay of Fundy, the Gulf of St. Lawrence heading in a great estuary that leads tide water seven hundred miles inland, Hudson Bay and the many channels between the Arctic islands must all be regarded as occupying "drowned lowlands." It is true that in geologically recent times a movement of uplift has carried wave-cut cliffs, wave-built beaches, and bay-floor sediments above the present sea-level around a great part of this continental border, thus partly restoring to the lands what they had previously lost ; but as the shore line is still fringed with bays, inlets, and fjords, the uplift cannot have been so great as the depression that preceded it. The outlying area of Greenland is a great plateau of ice and snow, burying a rugged land, whose shore line is fjorded like that of its neighbours.

From New York city southward, the dominating continental movement of recent times has been upward ; for the coastal plain of the Atlantic States and of the Gulf of Mexico (see Figs. 353 and 360), demonstrates elevation as clearly as the bays and fjords further north demonstrate depression. Here the coast is low and flat, fringed with sand reefs built by wave action on the shallow sea bottom. The elevation is complicated with recent depressions of slight amount, by which certain open valleys

along the coast from New Jersey to North Carolina have been transformed into shallow arms of the sea ; but this depression is evidently of less extent than the general uplift that preceded it, for the arms of the sea seldom reach to the inner border of the coastal plain. In spite of the depression, the continent retains some of the breadth gained by elevation, a welcome addition to the land surface in a latitude of mild climate, fully compensating for the submergence of certain lowlands further north, where the sea water is probably as valuable in providing fishing grounds and harbours as the lost lowlands would be for farming under the colder air of those higher latitudes.

West Indies.—Although the West Indies were in an earlier paragraph associated with South America, they may here be briefly described with the northern continent. They offer three distinct types of land forms. The larger islands, trending east and west, are the crest of great ridges that divide the adjoining seas into well separated compartments, and these ridges are best regarded as the submarine beginnings of an Antillean mountain system. Many of the Lesser Antilles, arranged in a curved line that recalls the island loops bordering eastern Asia, are of volcanic origin. The Bahamas are low islands of organic growth, formed in large part of wind-blown coral sand, of flat surface, and now partly submerged by recent depression. They have steep submarine slopes to the north-east, where the land rapidly descends to great depths beneath the Atlantic.

West Coast.—The western coast of North America repeats certain features of the eastern coast, but with diminished breadth. North of latitude 48°, there is the ragged outline that results from recent submergence ; but the measure of submergence appears to lessen along the western side of Alaska, where the great delta of the Yukon would imply that the land has been more stable than further south-east. The Aleutian Island chain, chiefly volcanic, is the first of the series of loops fringing the eastern border of Asia. For this reason, as well as for certain other features of resemblance, the frozen lowlands of north-west Alaska may be rather closely associated with those of north-eastern Asia, the two being separated only by the narrow and shallow waters of Bering Strait. Along the coast of southern Alaska and British Columbia, submergence has led the sea far into the valleys of the mountainous highlands. Some of the inner longitudinal valleys, beyond the outer ranges, are now under water, forming "canals" of great value for coastwise navigation ; the enclosing range stands forth in a chain of hilly and mountainous islands. The land hereabout commonly plunges at so steep an angle into the sea that level ground is wanting along the shore, except where rivers have built their deltas forward in protected bay heads.

Further south, the western coast of the United States and of Mexico exhibits signs of comparatively recent elevation, of increasing distinctness southward. Elevated beaches are described in Washington and California. Strips of coastal plains occur along the Mexican coast, but they nowhere

attain the breadth of those bordering the Atlantic, and moreover, disorderly movements have disturbed many of the littoral structures of California in comparatively recent times ; these movements being associated with the modern periods of growth of the western mountain system, and having no analogy along the Atlantic coast. Notable among illustrations of these littoral disturbances are the islands that lie off the coast of southern California, separated by deep-water channels from the mainland, and having the appearance of disordered and dissected blocks of the Earth's crust, here rising above the level of the sea. Appropriate to a region of recent disturbance, the continental shelf is of very moderate development, averaging not more than ten miles in breadth along the coast of California. It is trenched at numerous points by "submerged valleys," which are taken to indicate that for a relatively brief period the continental border stood higher than at present, but the submergence by which the present relative attitude of land and sea were gained did not suffice to produce a coast of very irregular outline, and this downward movement may be regarded as only an episode in a more general movement of irregular elevation.

On the coast thus fashioned, the attack of the sea has cut cliffs on the headlands, and has formed concave shores of sweeping curvature in the re-entrants ; well protected harbours are therefore relatively rare. The chief re-entrant of the southern coast is the Gulf of California ; this seems to be a trough of local depression, while the enclosing peninsula of Lower California is a mountain range of local and irregular elevation. The Valley of California between the Sierra Nevada and the Coast Range is another trough of local depression ; but here the trough is filled with land waste washed from the adjoining mountains, and forming a fluvial plain. The sea enters a short distance inland from San Francisco, here making the only strong re-entrant for a long distance along the Pacific border ; it has naturally become the site of the metropolis of western North America.

Laurentian Highlands.—The chief subdivisions of North America may now be reviewed in a general way. The Laurentian Highlands, with outliers in the Adirondack Mountains of New York and in the rugged uplands of northern Wisconsin and north-eastern Minnesota, consist of very ancient rocks. Their coarsely crystalline texture shows that the rocks now visible once lay far under ground ; for only deep within the crust can such rock texture be produced. Their greatly deformed structure indicates that the rock masses which formerly rose above the present surface once possessed a vigorous mountain form ; for mountains are the only form appropriate to such structures at the period of their deformation. The comparatively even surface of the highlands of to-day must therefore be regarded as the denuded platform of an ancient mountain system ; for only by great denudation can the former mountain cover of the existing textures and structures have been removed. But all this must have happened in the dawn of geological time, for the ancient mountains were worn low early

enough for some of the oldest fossiliferous strata to be laid upon their flanks when their borders were submerged beneath an ancient sea. The Laurentian Highlands may therefore be viewed as part of a very ancient land ; one of the earliest and most extensive lands of the globe.

Since the time when all this happened the geological history of the region has been uneventful. It has probably suffered repeated movements of elevation and depression, with corresponding alternations of denudation and deposition ; but as all the flanking Palæozoic strata are still essentially horizontal, no disorderly crushing and no great uplifts and dislocations can have taken place since their deposition. During certain periods of moderate elevation, valleys were eroded in the borders of the highlands ; and these, now partly drowned, determine the bays and fjords of the coast.

Glacial Action.—Most notable of all events since the great denudation of early time is the glaciation of the Laurentian region in a very modern stage of the Earth's history ; a time when these highlands resembled the Greenland of to-day. The ice sheets crept far south and west overland, and the results of their invasions on the bordering regions are of great geographical importance. The highlands themselves, scoured under the ice sheets, present a succession of rocky mounds and irregular hollows, drained by disorderly and undeveloped streams. Here we find ragged lakes, often having more than one outlet ; forested swamps and grassy marshes traversed by sluggish streams ; split rivers including large "islands" tens of miles in length, between the divided channels ; stretches of smooth streams in open valleys alternating with falls and rapids in rocky gorges. This great region, barren in the north-west, forested in the south-east, is an irredeemable wilderness.

A short distance outside the highland border, where the Palæozoic strata lie upon the floor of the older rocks, broad plains alternate with large lakes that occupy depressions in the weaker layers ; ten or more important water bodies lie in a curve from Lake Ontario to Great Bear Lake. The history of these lakes has gained an almost dramatic interest in recent years, for it has been shown that they are the residuals of much greater lakes that for a time occupied the lacustrine belt when the present outlets were closed by the retreating ice sheet of the last glacial invasion. The expanded waters of the glacial-marginal lakes carried silt from the melting ice, and

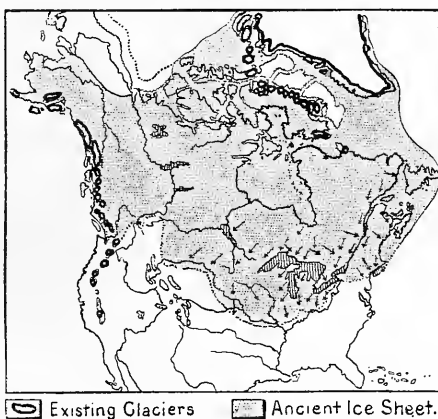


FIG. 329.—The Glaciation of North America.

the lake floors now laid bare form smooth prairies of fine deep soil, yielding great crops of wheat if not too far north. Their fertility coupled with modern means of transportation have seriously affected the commerce in the food supply of the world. The lakes still remaining afford a marvellous system of inland waterways.

South and west of the lake belt, glacial action has been on the whole constructive, instead of destructive. For tens of miles together, not a ledge of rock is to be seen; the surface is heavily sheeted with glacial drift, the greater part of which has a fine and fertile soil. Although commonly treated as if pertinent to geology, it cannot be questioned by those who know the appearance of this vast drift-covered prairie region that glacial action has many geographical consequences.

Appalachians.—The Appalachian highland, extending from Newfoundland to Alabama (and probably reappearing west of the Mississippi in

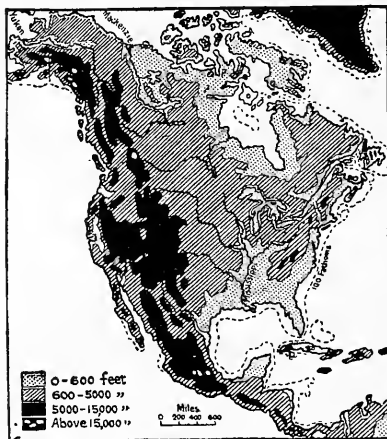


FIG. 330.—*Configuration of North America.*

Arkansas and Indian Territory) is one of those old mountain ranges, made in the earlier and middle ages of the Earth's history; so long ago that the original mountains have been for the most part worn down to lowlands; their present moderate height is due to the local success of the most enduring rocks in resisting complete denudation, or to a relatively modern uplift of the region to upland height; or to both causes combined. Being so old, the Appalachians have none of the bold and irregular forms of younger and more vigorous mountains, where lofty peaks rise between deep passes. Ridges with even crest lines and broad uplands separated by open and populous valleys are the prevailing forms. Only the culminating parts of the system, the White Mountains of New Hampshire and the Black Mountains of North Carolina, retain distinctly conical or peak-like forms, and even here, forests clothe most of the mountain slopes, only occasional summits rise above the tree line, and bare, angular crags are seldom seen. The middle part of the system, known as the Allegheny Mountains in Pennsylvania and Virginia, is of moderate elevation, and is intersected by many and broad valleys. Immigration into the Ohio valley was here less obstructed by the mountain ridges than by the Allegheny plateau which lies west of them.

Trends in a north-east and south-west direction predominate in the Appalachians, as may be seen in the land arms and fjords of Newfound-

land and Nova Scotia, as well as in the ridges and the valleys of the Alleghenies in Pennsylvania and Virginia. The boundaries of the system are of interest in connection with its physical history. From New York to Newfoundland the Appalachian belt of New England and the Provinces dips under the sea on the east and north-east ; its structures do not end, they simply descend beneath the sea and are lost to sight on account of a recent continental depression. As the uplands slant down to lowlands near the coast they are occupied by a large population, especially in the harbour cities where manufacturing and commerce are active. Further inland the population is almost limited to the open valleys. From New York to Alabama, the Appalachian structures decrease in height to the south-east and south, and disappear under the coastal plain of the Atlantic and Gulf States ; the inner margin of the plain roughly marks the shore line of an earlier period of continental depression. Here a rural population occupies the broader valleys and the lower uplands ; the chief cities being associated with the inner border of the coastal plain, where rapids in the outflowing rivers afford water power ; and again with the outer border of the plain where the bays and the estuaries give harbourage to seagoing vessels. Only on the north-west is a true termination of the mountain system discovered. Here the deformations that give so distinct a trend to the upland ridges and valleys of the Appalachians die out. The Laurentian uplands and the Adirondacks, consisting of ancient rocks long undisturbed, adjoin the Appalachians of the Provinces and of New England ; the Allegheny plateau, of nearly horizontal sedimentary strata, adjoins the Appalachians of the middle and southern States.

The Allegheny plateau is known as the Catskill Mountains in New York, and the Cumberland tableland in Tennessee and Alabama. Between these two extremes much of its hilly surface is known as the Allegheny Mountains, although this term should properly be restricted to the long, even-crested ridges that lie next to the south-east from Pennsylvania to Tennessee. Taking the plateau altogether, it descends by a strong escarpment into the valleys of the Alleghenies on the south-east, while it gradually decreases in altitude towards the prairies of the middle Ohio and Mississippi on the west. Throughout this plateau, as well as among the Pennsylvania ridges on the east and under certain of the prairies further west, lie the great stores of coal on which the industrial prosperity of the eastern United States largely depends.

Rocky Mountain System.—The western highlands of North America, or the Rocky Mountain system in general, is widest in latitude 40° ; and thence narrows to its end in the Alaskan range about latitude 63° , and to its termination near the great Mexican volcanoes in latitude 18° . Its eastern boundary is generally well defined by a sudden descent to the Great Plains. Its western border touches the sea for nearly all its length. Within its area there is a great variety of structure and form. The Selkirk Range, crossed by the Canadian Pacific Railway, and the broad St. Elias Alps in

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Alaska, are truly Alpine in form, with great snow-fields and long glaciers. The Cascade Range in Washington and Oregon and the southern ranges of Mexico are crowned with great volcanic cones. Extensive plateaux of horizontal structure are found in Arizona, Utah and New Mexico, bearing dissected volcanic cones and lava flows on the uplands, and trenched by deep canyons, of which that of the Colorado is the most famous. Vast lava plateaux occupy intermont basins in Idaho and Washington, where they are cut down in the canyons of the Columbia and Snake rivers ; that of the Snake being less known but hardly less marvellous than that of the Colorado. Many ranges of moderate dimensions inclose intermont depressions that are now occupied by aggraded or waste-filled plains ; the plateau of Mexico being only an extensive development of these basins between the eastern and western ranges of the Sierra Madre.

As is the rule among mountains, the individual ridges generally result from the erosion of valleys in broadly uplifted ranges, rather than from direct and local uplift. Many of the separate ridges of the Rocky Mountain ranges in Canada and Montana are thus produced ; the view from their summits disclosing a " sea of mountains," ridge following ridge to the horizon, like waves on the ocean. The peaks frequently attain, but seldom exceed, a height of 12,000 or 14,000 feet. Greater elevations are found in the far north-west where Mounts St. Elias and Logan exceed 18,000 feet on either side of the Alaskan boundary, and in the far south, where the Mexican volcanoes rise above the snow line to similar but slightly less altitudes.

In certain parts of the western highlands, dislocation is more directly responsible for the existing relief of the land ; and this as well as the great general altitude of the region places it in strong contrast with the lesser eastern highlands. Certain of the mountain ridges and ranges are the immediate result of the uplift of the crust-blocks whose initial form has not yet been wholly effaced by the carving of valleys on their flanks. The Sierra Nevada is, in a large way, a great tilted block, or series of blocks, the eastern face being short and steep, the western slope being long and relatively gentle ; both faces are now scored by deep valleys through which the mountain waste is carried out to form the adjacent plains. The lofty plateaux of Arizona are bounded by great cliffs, the edges of the huge plateau-blocks, that have been uplifted to altitudes differing by a thousand feet or more, and now made rugged by gnawing streams. Further east, basins among the mountains of Colorado, Wyoming and Montana, are the obverse of the ranges that have been uplifted around them, the basins being heavily aggraded with the mountain waste. It is believed that lakes occupied some of these basins for a time, but that stage is now past ; the outflowing rivers have cut down the enclosing ranges in deep gorges, still so narrow as to be impassable except to carefully constructed railroads. It is in the basins that most of the population gathers in the mountain region.

South of latitude 18°, the mountains of Central America are largely volcanic, with little relation to the features of the Rocky Mountain system. Where ridges appear, they generally have east and west trends, and thus seem to be associated with the Antillean Mountain system, of which the greater part is submerged in the Caribbean Sea and made known only by soundings as submarine ridges.

The Great Plains.—The Great Plains slope eastward from the base of the Rocky Mountains. They are broadest between latitudes 35° and 55°. Further north, they are narrowed by the convergence of the lacustrine belt on the east and the mountains on the west; further south, they merge into the coastal plain of the Gulf of Mexico; beyond southern Texas their width is measured only in tens of miles. Over their widest expanse they present a vast surface of moderate yet varied relief. They are frequently interrupted by embossed mesas and escarpments, or by incised valleys; yet the name of "plains" is well applied, for the view from every little eminence is almost as boundless as upon the sea. On the east, the plains merge into the prairies; on the west they are interrupted by foot-hills and outlying ridges near the base of the mountains. A mountain group in Dakota known as the Black Hills, named from the dark forests that crown it, diversifies the treeless plains and introduces mining and lumbering in the midst of open cattle ranges. The Ouachita ridges extending westward from Arkansas, break in upon the plains about latitude 35°; further south they are known in Texas as the "Llano estacado" with bold and ragged escarpments on nearly all sides.

Like the vast plains of eastern Europe and western Asia, the Great Plains of North America stretch over so great a distance on the Earth's convex surface that they are more varied in climate than in form. Far north, they are frozen and barren. Between latitudes 50° and 60°, they are forested, the temperature here not being low enough to prevent tree growth and not high enough to cause active evaporation and leave the surface arid. From 55° southward into Mexico, the plains are treeless for the most part, this being a direct result of their dryness, which in turn is due almost as largely to their summer warmth as to their light rainfall. In Mexico and Yucatan, where the rainfall increases under the trade winds, the lowlands have a tropical flora of increasing richness southward; in contrast to the mild climate of the plateaux, the narrow coastal plains are here known as the "tierra caliente."

Climate.—The varied climates of North America afford many combinations of the geometrical zones of temperature, wind, and rainfall, appropriate to the globular form of the Earth, with the irregular or arbitrary arrangement of these climatic factors caused by the non-geometrical outline and relief of the lands.

Zonal arrangement is seen in the decrease of temperature and rainfall from almost equatorial conditions at the Isthmus of Panama, to almost polar conditions bordering the Arctic Sea. It is displayed with equal distinctness

in the easterly winds of the torrid belt that cover the peninsular and insular lands on the south, and in the stormy westerly winds that prevail over a broad belt of middle and higher latitudes. The irregular distribution of the climatic factors is seen in the far northward summer migration

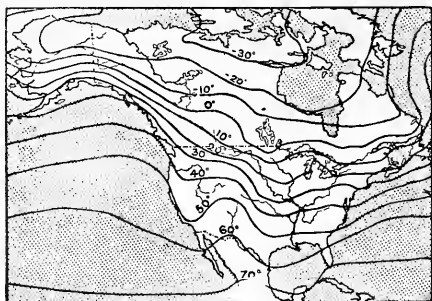


FIG. 331.—North America. Isotherms for January.
(After Buchan.)

of the heat equator to the deserts of Arizona and western Mexico as compared with the moderate migration on the oceans, and in the great annual temperature range with extreme winter cold on the central plains of Canada, in contrast to the moderate ranges prevailing over the oceans in similar latitudes. It is found again in the plentiful rainfall of the western mountain slopes in temperate latitudes, while the intermont basins and the eastern slopes are dry, and in the abundant rainfall of the eastern slopes in the trade wind belt, where the western slopes are relatively arid. Nothing can be more striking than the contrast between the moderate change of seasons along the Pacific coast from Alaska to California, and the violent changes from winter to summer in the interior and along the middle Atlantic border. These unlike conditions are dependent partly on the arrangement of ocean currents as guided by continental barriers, and partly on the distribution of temperatures by the prevailing winds. The British Islands have, under the benign influence of the North Atlantic drift, the most abnormally mild climate for their latitude in the world; Labrador in the same latitude has one of the most severe of climates. It is a frozen and snow-covered wilderness in winter; it might have a comparatively high mean temperature in summer, but for the chill that is received when the wind blows inland from the cold ice-laden current along its coast.

Following upon these great interior changes of temperature, the prevailing winds exhibit something of a monsoon effect in certain regions. They frequently blow from the Gulf of Mexico up the Mississippi valley in summer, and down the valley to the Gulf in winter. Some indications of inflow and outflow may also be perceived in summer

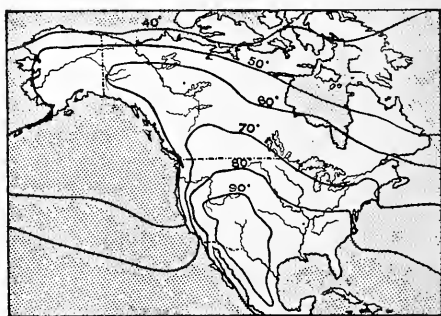


FIG. 332.—North America. Isotherms for July.
(After Buchan.)

and winter along the Arctic coast. There is furthermore a breaking of the wind belts merely from the occurrence of transverse land barriers. It is chiefly on account of the obstacle formed by the western highlands that a branch of the prevailing westerly winds turns towards the trades off the Pacific coast, especially in winter when the low continental temperature discourages the entrance of winds from the ocean. Similarly, the trades give forth branches to the westerly winds east of the Mexican highlands, especially in summer when the high continental temperature persuades the winds to blow inland.

The ovals of high and low pressure, known as cyclonic and anticyclonic areas, which so markedly characterise the westerly winds of temperate latitudes, are not only well developed as they drift across North America, but they have been abundantly charted in the great series of official weather maps for the United States and a bordering belt of Canada. While the anticyclones are generally associated with fair weather, the cyclonic areas provide most of the heavy clouds and rainfall on their path. During the passage of these atmospheric disturbances across the interior plains, they determine the strong changes of weather for which the region

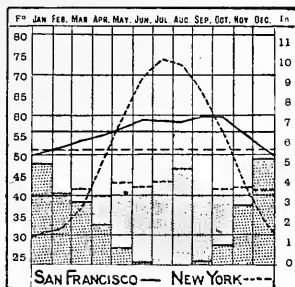


FIG. 333.—Temperature and Rainfall Curves for San Francisco and New York.

is noted; the vast extent of comparatively low open country permitting a free importation of air currents from frigid and torrid latitudes on either hand.

Rainfall and Vegetation.—While the extremes of temperature are the controlling climatic factors in determining the vegetable products and human industries between the far north and south, variation of rainfall exercises the most important climatic control across the great breadth of the continent in middle latitudes. A vast extent of country in the interior, shut off by the mountains from the moist winds of the Pacific, is too dry for ordinary processes of agriculture, unless resort is had to irrigation. Where most arid, the surface is a desert, although seldom so absolutely barren as the driest deserts of the Old World. Where a light rainfall is received, a thin growth of grass that once supported vast herds of bisons now gives scanty pasture to ranging cattle. Trees are wanting

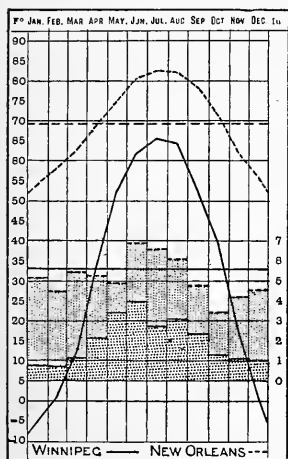


FIG. 334.—Temperature and Rainfall Curves for Winnipeg and New Orleans.

over a great space of broad plains and intermont basins west of the rooth meridian; but the mountain slopes are forested, especially as the Pacific is neared, the western descent of the Cascade Range being

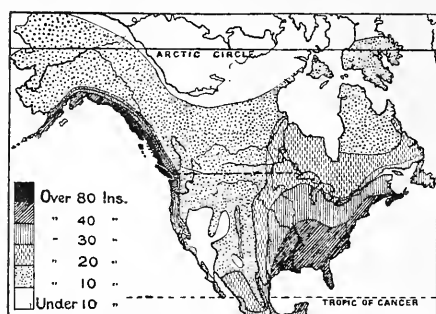


FIG. 335.—The Mean Annual Rainfall of North America. (After Suñan.)

densely occupied by trees of great size. East of the 90th meridian, excepting for the prairies of the Mississippi and Winnipeg region, and the barren grounds of the far north, forests originally covered the entire country, for here the beneficent submergence under the Caribbean and Mexican Mediterraneans of what would otherwise be an American Sahara permits a plentiful rainfall over the

eastern part of the continent. When first explored, great tracts of forest were found to have been devastated by fire. Although the forests have now been extensively cut for timber and cleared for farming, the living trees at present are believed to be not greatly decreased below the number that were growing at the time of first settlement.

Aboriginal People.—Four hundred years ago, North America was for the most part thinly populated by savage or barbarous peoples. In Mexico and Central America the inhabitants had developed an elaborate stone architecture, shown now in the temples whose ruins are often concealed under heavy forest growth. Further north, numerous earthworks and fortifications mark the sites of pre-Columbian settlements, as in the Ohio basin; these are by some attributed to an extinct people; by others, to the immediate ancestors of the wandering warlike tribes, to whom a memorial of Columbus's faulty reckoning of longitude still clings in the name of "Indians." The early Americans had learned to do simple weaving, to make rough pottery, to carve shells, to hammer the native copper of Lake Superior, and to chip flints and polish stone implements in the neolithic fashion. They seem to have had no horses when first discovered, but the tribes of the open prairies and plains became expert horsemen in later times. In the western desert interior there are "pueblos," or villages, built for protection on isolated mesas, still occupied, and probably to be associated with the abandoned cliff dwellings of the neighbouring canyon walls. On the north-west coast there are tribes remarkable for their fantastic wood carvings. In the far north the Eskimos are made torpid, as far as development goes, by the extreme rigour of their surroundings. Striking differences of language prevailed among many of the tribes, especially those on the Pacific slope.

History.—The early discovery of North America by the way of

Iceland seems to be authenticated in the "Sagas," but no traces of previous settlements were found by later comers. The Columbian discovery sooner or later led the Spaniards to found colonies from Florida southward, the French from Louisiana and Acadia (now Nova Scotia) northward, and the British along the middle Atlantic coast. Conquest, treaty and purchase have now placed the Anglo-Saxon element in possession of the continent from Mexico northward. The defeat of the French at Quebec in 1759 brought to the British crown all the St. Lawrence region except some small "enclaves" on or near Newfoundland. The last quarter of the eighteenth century witnessed the stormy separation of the Atlantic colonies from the United Kingdom, and their union in the first of the great modern republics—the United States. Purchase in 1803, when the Emperor Napoleon was in need of money, brought Louisiana (the western basin of the Mississippi)

to the United States, and in 1867 added the previously Russian territory of Alaska to the Republic. Mexico and the other Central American States secured their independence from Spain in the first quarter of the nineteenth century, and adopted republican forms of government (Fig. 350). The attempt to bring Mexico again under European control, at a time when the United States was distracted by civil

war, fortunately met early failure. In the meantime, fed by a great number of European colonists, the several northern British colonies (except Newfoundland) have united in the Dominion of Canada, which now stretches from the Atlantic and Pacific to the Arctic; the territory of the United States has been extended west to the Pacific, partly by exploration, partly at the expense of Mexico; and, as a result of the war of 1898, Cuba has been separated from Spain, and Porto Rico fallen to the share of the United States as one of the first non-Continental possessions which the future seems to have in store for it.

The rapidity with which the northern New World has been turned to the uses of civilisation is an appropriate consequence of the century of steam, electricity, and the wholesale production of steel. Railways and telegraphs now unite the Pacific and Atlantic slopes of North America, and serve as political as well as commercial bonds between the east and west. Steamships and cables bring Europe and North America into the

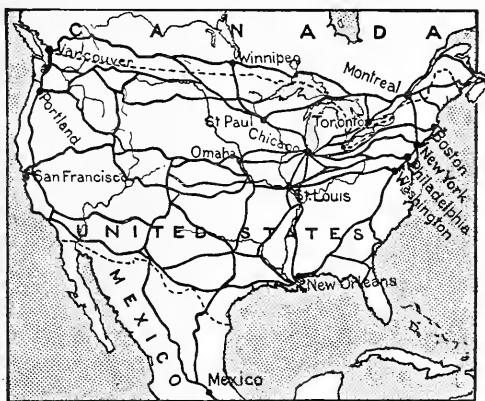


FIG. 336.—Chief Railways of North America.

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closest relations as to people and commerce. Even so small a matter as getting the time by one's watch is now done in concert, not with the people of North America alone, but with those of western Europe as well, for the greater part of the northern New World is divided into "time belts," whose noon hour falls four, five, six, seven or eight hours earlier than noon at Greenwich. Isolated villages in the backwoods may still hold to the old-fashioned habit of keeping local time, but the larger communities which use the railways as the basis of nearly all activities, adopt Atlantic, Eastern, Central, Mountain or Pacific time, according to their position.

STATISTICS.

THE COUNTRIES OF NORTH AMERICA.

	Area in square miles.	Population.
United States of America (including Alaska)	.. 3,501,000 ..	75,560,000
Dominion of Canada 3,300,000 ..	5,370,000
Mexico 767,000 ..	13,500,000
Newfoundland (and Labrador) 161,000 ..	217,000

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CHAPTER XXXVIII.—COLONIAL NORTH AMERICA

I.—THE DOMINION OF CANADA

BY J. B. TYRRELL, M.A., B.Sc.,

Formerly of the Geological Survey of Canada.

Position and Boundaries.—British North America, including under this name Canada and Newfoundland, occupies the whole of the northern part of the continent of North America, except Alaska, which belongs to the United States. It lies between longitudes 53° and 141° W., and touches the 42nd parallel on the south. The total area is rather over three and a half million square miles, or slightly larger than the United States, including Alaska, and somewhat smaller than the whole of Europe. Its greatest length, on a line drawn from Cape Race, in Newfoundland, to Mount St. Elias, on the boundary of Alaska, is 3,400 miles.

Its only land boundary is with the United States, being separated from the territory of Alaska by the meridian of 141° W., and an undemarcated line parallel to the Pacific coast. The southern frontier, 3,260 miles in length, passes through the straits of Juan de Fuca and Haro on the west, along the parallel of 49° N. to the Lake of the Woods, east of which it takes a very irregular course, passes through the middle of Lakes Superior, Huron, Erie, and Ontario, then follows the highlands north of the State of Maine, and finally turns southward to the mouth of the St. Croix river on the Bay of Fundy.

Coasts.—The eastern continental shore extends from the mouth of the St. Croix river in a very sinuous course northwards to Cape Chidley. The Gulf of St. Lawrence, which is its most conspicuous and important hydrographic feature, is a pear-shaped sea 500 miles long, cut off from the main Atlantic by the islands of Newfoundland and Cape Breton, and receiving on the west the great river St. Lawrence. The islands of Prince Edward and Anticosti lie within it. The northern coast of the mainland extends from Cape Chidley to Demarcation Point, on the border of Alaska, north of which is the immense Arctic archipelago, the islands for the most part being separated by rather shallow water. Hudson Bay, which is a great indentation on this northern coast, is one of the most important physical features of the Dominion of Canada, extending, as it does, southward until it reaches to within 300 miles of the

north shore of Lake Superior. It thus divides the land-mass of Canada into two great parts, the smaller lying east and south-east, and the larger west of its shores. It is an inland sea, 1,300 miles in its greatest length, and 600 miles in maximum breadth, with an average depth in the centre of 60 fathoms. Its water, except in James' Bay, is clear and salt like the Atlantic, with which it is connected by Hudson Strait. The Pacific Coast-line, beginning at the Strait of Juan de Fuca, runs north-westward to the southern extremity of Alaska, a distance of 530 miles. It has an extremely irregular outline, on account of the many fjords and off-lying islands.

Configuration and Geology.—The land-surface of Canada, and

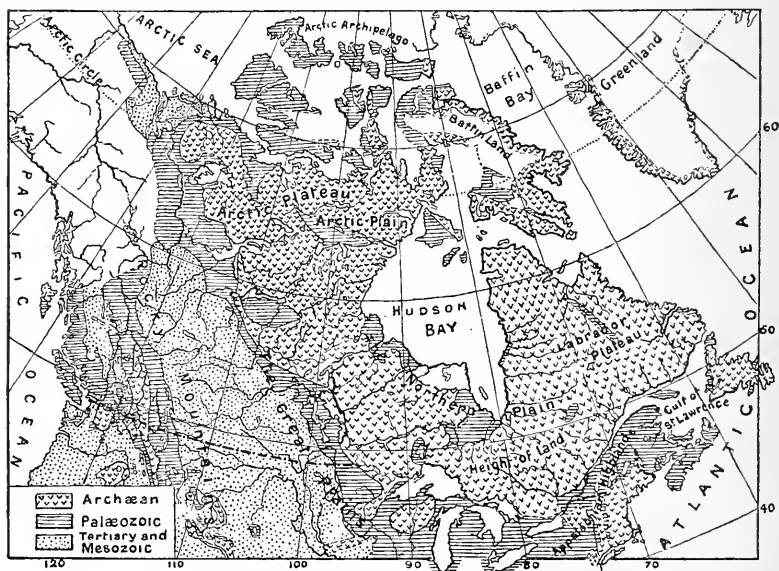


FIG. 337.—*The Geological Structure of Canada.*

in fact of the whole of the North American continent, has been built up around a great V-shaped area of Archæan rocks, which extends from the northern and eastern shore of Labrador round the north of the Great Lakes, and thence north-westward to the Arctic Sea. In the centre of this V lies Hudson Bay, while around it are the fertile plains of eastern and western Canada. This area, which has been called the Laurentian plateau, has a gently undulating rocky surface, in which the existing streams have nowhere cut deep valleys. In the depressions are some considerable areas of fertile land, but as a rule the region cannot support a large agricultural population. The eastern and western borders of the

continent rise in two main systems of mountain chains, known respectively as the Appalachian and Cordilleran systems, the former dying out in eastern Canada and Newfoundland, while the latter, which forms the backbone of the continent, runs to its highest summits in north-western Yukon, where Mount St. Elias has an altitude of 18,010 feet, and Mount Logan a reputed altitude of 19,500 feet. Between the Laurentian plateau and the Appalachian Mountains lies the fertile plain of the Great Lakes and the St. Lawrence valley, which as yet contains the larger portion of the population of Canada, while between the Laurentian plateau and the Cordilleran chain lie the vast plains and prairies of western Canada. The country has been divided by the late Dr. G. M. Dawson into :—(1) *Eastern lowlands and hills*, almost entirely based on old and hard Palæozoic rocks. (2) *The Laurentian plateau*. (3) *The inland plains*, principally based on the comparatively soft rocks of Mesozoic age, which still lie nearly as flat as when they were originally deposited. (4) *The Cordilleran or western mountain region*.

Hydrography.—The mainland of Canada may be divided into four hydrographic basins.

(1) In the Atlantic basin the principal stream is the St. Lawrence, which rises far in the interior of the continent, and after a course of 2,100 miles, in which it chains the most magnificent series of fresh-water lakes in the world, empties by a wide and deep estuary into the Gulf of St. Lawrence. Its basin has an area of half a million square miles. From Lake Erie, the Niagara river is broken by the Niagara Falls, where the whole drainage of the four upper lakes plunges 167 feet over a rocky ledge.

(2) The drainage basin of Hudson Bay is the largest in the Dominion, and into it converge streams flowing from the east, south, and west. Of these the Saskatchewan-Nelson is the most important for length, drainage-area, and the fertility of the land it drains.

(3) The principal stream in the Arctic drainage-area is the Mackenzie river, whose sources are mainly in the Rocky Mountains. The Finlay and Peace form the longest of the tributaries, though the Athabasca, rising farther south, is usually regarded as the main upper branch of the river. Athabasca, Great Slave and Great Bear Lakes—three of the largest of the many great bodies of water which lie along the edge of the Laurentian plateau—are tributary to the Mackenzie.

(4) The Pacific area is in part drained by rapid streams which flow more or less directly into the ocean, among which the Fraser is the most important ; and in part by the Yukon which rises behind the Coast Range and flows more or less parallel with that range, northward through the Yukon district, and westward through Alaska, 644 miles being in Canada.

Climate.—In so extensive a region the climate necessarily exhibits great diversities, but for the most part it may be said to be continental.

Dr. G. M. Dawson divides the whole country into three climatic areas. (1) The Eastern region characterised by great range of temperature and ample rainfall. This includes all the older provinces of Canada, with Newfoundland, and extends westward nearly to Winnipeg.

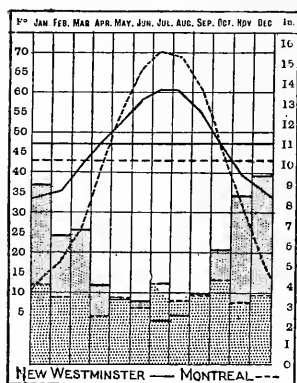


FIG. 338.—Temperature and Rainfall of New Westminster and Montreal.

(2) The Inland region, adjoining the last and stretching westward to within a short distance of the Pacific Coast. This is characterised by very great range in temperature and moderate rainfall. It includes the great prairies and open plains, but is also in large part more or less wooded. (3) The Pacific Coast region, which does not include the whole Pacific slope, but only a narrow belt on the seaward side of the western mountain range of the Cordillera. The climate is oceanic, with small range of temperature, and great rainfall and humidity.

The following table of mean temperature illustrates these climates :—

		Summer. (July, August, September.)		Winter. (January, Feb- ruary, March.)		Range between Mean Summer and Winter.
<i>Eastern.</i> —Charlottetown, P.E.I. ..						
	..	61.9	..	19.8	..	42.1
" St. John, N.B. ..	..	58.5	..	22.3	..	36.2
" Halifax, N.S. ..	..	61.6	..	24.7	..	36.9
" Montreal, Que. ..	..	64.8	..	17.1	..	47.7
" Toronto, Ont. ..	..	64.1	..	24.6	..	39.5
<i>Inland.</i> —Winnipeg, Man. ..						
	..	59.7	..	1.5	..	58.2
<i>Pacific.</i> —Victoria, B.C. ..						
	..	57.0	..	41.0	..	16.0

Forests.—Speaking generally, British North America is a region of forest, and east of Winnipeg almost all of the land which is now under cultivation has been cleared of the heavy growth of timber which once covered it. Extending from the Atlantic to the Pacific, and with a width of from 200 to 300 miles, is the vast sub-Arctic forest which is composed largely of black and white spruce (*Abies nigra* and *A. alba*) and larch (*Larix Americana*). These trees have essentially the same northern limit, the black spruce dwindling to a shrub before it disappears, while the others retain throughout their tree-like character. The northern limit of the forest, and the southern edge of the "Barren Lands" is not determined by winter cold, or mean annual temperature, but is controlled entirely by the length and warmth of the summer; the northern limit of the forest closely follows the line of a mean summer temperature of 50° F.

In eastern Canada this sub-Arctic forest merges on the south into a forest of deciduous trees, characterised by the great number and variety of its species, there being sixty-five species in Ontario alone. In western Canada the trees of the more southern forest continue chiefly coniferous in type,

but on account of the moistness of the climate many attain to gigantic size. In central Canada the coniferous forest is skirted by a belt fifty to a hundred miles wide of intermittent forest of aspen (*Populus tremuloides*), south of which are the open grassy plains, where the climate is too dry for the growth of continuous woods.

Fauna.—One of the most interesting animals to be found on the continent is the musk-ox (*Ovibos moschatus*), which lives, even in winter, on the Barren Lands and on the Arctic islands. Barren-ground caribou (*Rangifer grœnlandicus*) roam in great herds over the same plains in summer, but in winter most of them go south within the edge of the forest. The five remaining species of deer, including the moose (*Alces Americanus*), and the *waskasew*, or American elk (*Cervus Canadensis*) inhabit different parts of the woodland area to the south. Bison (*Bos Americanus*) formerly ranged in countless herds over the plains and prairies east of the Rocky Mountains, but in the wild state they are now practically extinct. Prong-horned antelope are still fairly numerous on the plains, and mountain sheep and mountain goats are to be found in most of the more inaccessible parts of the Cordilleras. The sub-Arctic forest is the home of the most important fur-bearing animals, including the beaver, bear (brown and black), marten, musk rat, otter, fisher, fox (black, red, and white), mink, lynx, skunk, and wolverine. Most of the birds are migratory, breeding during the summer in the north, and going south as the winter sets in. Perhaps the most interesting bird is the Canada jay, or whiskey-jack (*Perisorens Canadensis*), which lives throughout the year in the sub-Arctic forest, and nests and hatches its young in February and March, during the severe cold of the winter season. The coastal waters, rivers and lakes abound in fish, among which the most important are the cod, salmon, herring and whitefish.

People.—When the country was discovered by Europeans, it was occupied by a scattered native population, who were then called Indians. Their descendants are still scattered throughout the whole Dominion, those in the more thickly inhabited districts having adopted the habits and modes of life of the white people in the vicinity, while those in the more remote regions still live by hunting and fishing. The Indians now number about 100,000, or about one-fiftieth of the population.

They are divided into a large number of tribes, which belong to about ten or eleven distinct linguistic stocks. Of these the *Algonkian* is much the largest and most important, for its people occupy the greater part of the sub-Arctic forest from the Atlantic to the Rocky Mountains, and they are, *par excellence*, the fur hunters of Canada. They travel chiefly on the lakes and streams, the birch-bark canoe being their peculiar boat, and the birch-bark tent, or wigwam, their home. The Crees, Ojibways, and Blackfoot

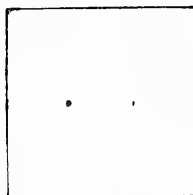


FIG. 339.—Average population of a square mile of the Dominion of Canada.

belong to this stock. North of them, to the edge of the Barren Lands between Hudson Bay and the Pacific, are the tribes of the Tinné stock, who are for the most part deer hunters. Further north the Eskimo, or Innuits (Inūwī), inhabit the whole northern coast from the Strait of Belle Isle to Alaska, including parts of the shores of Hudson Bay. They are strong and well-built, good hunters, endowed with remarkable perseverance, and capable of enduring great fatigue. They live chiefly on marine animals, which they kill with a spear or harpoon, but there is also an inland tribe on the banks of Kazan river, west of Hudson Bay, which subsist almost entirely on reindeer. The Iroquois were the ablest, both intellectually and physically, of all the North American Indians, and their Confederacy, known as the Six Nations, for a long time held the balance of power between the early English and French settlers. They now live in the settled parts of Ontario and Quebec. The Sioux, or Assiniboines, live on

the western interior plains, while the Haida, Kwakwaka'wakw, Tsimshian, Salish, and Kootenay live on the coast or in the broken mountainous districts of British Columbia.

Of the population of Canada in 1891, 86 per cent. were born in Canada, and 10 per cent. in other parts of the British Empire. Of these 29 per cent. speak French, while almost all the rest speak English. Forty-one per cent. are Roman Catholics, while most of the remainder belong to various Protestant denominations.

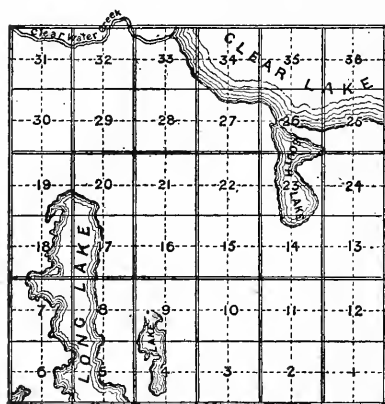


FIG. 340.—A typical Township Plan of 36 square miles showing Sections and Quarter-sections.

In the unoccupied parts of the western provinces and territories, land may be obtained either free or at a nominal cost by any one willing to settle upon and work it. This land is held as the property of the Dominion Government until allocated, and the Dominion Land Survey is charged with surveying the unoccupied country and marking it out into rectangular townships, each of six miles square divided by lines running north and south and east and west into thirty-six sections of one square mile each. Thus every piece of land is readily identified.

Internal Communications.—The great rivers and lakes of Canada have furnished means of access from the coast to the interior from the dates of the very earliest settlements. This is especially true of the St. Lawrence, which is navigable to Montreal for ocean-going steamers drawing 27½ feet of water. Thence steamers can ascend to the head of Lake Superior, the obstructions in the rivers being overcome by eight canals and fifty-four locks, which have a depth of fourteen feet or more.

The Saskatchewan and its branches are continuously navigable for steamers of light draft for 1,200 miles ; the Mackenzie and its tributaries have 4,300 miles of navigable waters, broken at only three places by rapids or falls. In the Yukon basin there are about 2,600 miles of continuous navigation.

An extensive system of railways now unites the Atlantic to the Pacific Ocean, serving the whole of the settled part of the country and opening up much of the interior to settlement. The total length of these railways in 1902 was 18,714 miles (see Fig. 336), and large schemes of railway extension have been proposed.

Government.—The Dominion of Canada is a federation of self-governing colonies associated for common affairs. The Dominion Government consists of (1) a Governor-General appointed by the British Government to represent the Crown for a term of five years ; (2) a Senate of 81 members appointed by the Crown (on the advice of the Privy Council of Canada) for life ; (3) a House of Commons of 213 members, elected for five years on a very liberal franchise, liable to be dissolved by the Governor-General on the advice of the Ministry ; (4) an Executive Ministry composed of 13 or more members, having seats in the two Houses of Parliament, and holding office only so long as it has the support of the majority of the members of the House of Commons ; (5) a Dominion Judiciary composed of six judges, acting as a Court of Appeal from all the provincial courts, though its decisions are subject to review on appeal by the Judicial Committee of the Queen's Privy Council in London.

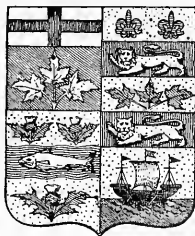


FIG. 341. — *Armorial Bearings of the Dominion of Canada.*

In each of the provinces there is a Lieutenant-Governor, appointed by the Governor-General in Council for a term of five years ; a Legislative Assembly composed of members elected for terms of four or five years ; and also in Nova Scotia and Quebec a Legislative Council or upper house appointed by the Lieutenant-Governor in Council for life. There is also an Executive Council of from 5 to 12 members, who hold office as long as they are supported by a majority in the popular Assembly. A Judiciary in each of the provinces is appointed by the Governor-General in Council. Besides these there are in most of the provinces municipal or local councils, who have the control of their local affairs, and have the power to tax for the support of schools and the prosecution of public works of a local character.

NOVA SCOTIA

Position and Coasts.—Nova Scotia, the most south-easterly province of the Dominion of Canada, consists of a long and rather narrow peninsula, extending in a south-west and north-east direction, and the large island of Cape Breton, lying off its north-eastern end. It lies

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between $59\frac{1}{2}^{\circ}$ and 66° W. long., and $43\frac{1}{2}^{\circ}$ and 47° N. lat., being thus in the same latitude as Switzerland and the south of France. Near the middle of its north-western side it is connected with New Brunswick by an isthmus which at one point is only 16 miles in width.

The south-western portion of the peninsula has the Bay of Fundy and Chignecto Bay on the south, while the north-eastern end of the peninsula and Cape Breton Island are bounded on the north by Northumberland Strait and the Gulf of St. Lawrence. The Gut of Canso, only a mile and a half in width at its narrowest part, separates Cape Breton Island from the mainland, and the island itself is almost divided by an arm of the sea known as Great Bras d'Or. The Atlantic coast is bold and rocky, and is indented by many bays, almost all of which furnish safe anchorage for the largest ships. On the southern shore of the Bay of Fundy the coast is much less broken, and the northern shore forms a moderately regular coast from Bay Verte round the north point of Cape Breton. Pictou Harbour is the most important of the several good harbours on the north coast.

Along the southern coast of the province, where the waves of the Atlantic Ocean have carved the shore into very irregular shapes, there are many small rocky islands. Sable Island lies 85 miles out in the open Atlantic. It is a chain of sand dunes, 20 miles long and a mile wide, resting on a more elevated part of the submarine banks, and forming a great danger to shipping. Lighthouse and life-boat men are the only inhabitants.

Configuration.—The surface of the province is rather irregular, being formed of ridges, often diffuse and indefinite, which run more or less parallel to the long axis of the peninsula, and intervening plains and valleys. These ridges, which nowhere rise more than 1,200 feet above the sea, are formed, like those of Newfoundland, by the outcrops of harder rocks. The highest range, known as the Cobequid Mountains, runs from the Bay of Fundy eastward to the Gut of Canso. A high bold ridge of trap, known as North Mountains, forms the southern shore of the Bay of Fundy, extending from Brier Island to Cape Blomidon, on the south side of which, underlain by Triassic sandstone, is the Annapolis valley, the garden of the province. Farther south, where the country is underlain by Cambrian schists, quartzites, and intrusive granites, agricultural land is mainly confined to the river valleys.

Climate.—The climate of this and the adjoining provinces of New Brunswick and Prince Edward Island is more humid and much more variable than that of central Canada, and fogs are common along the northern and eastern coasts, where the cold Arctic currents hug the shore.

People and Industries.—Nova Scotia was probably the land discovered by Lief Ericson, the Northman, in A.D. 1000, and it was rediscovered by Cabot in 1498, shortly after which its shores and harbours were resorted to by French and Portuguese fishermen. In 1605 the French founded the first European settlement on the shores of Annapolis basin, and

for the next century, until the Peace of Utrecht was signed between France and the United Kingdom, Acadia (French, Acadie) remained in the hands of the French; then under the name of Nova Scotia it became a British colony and entered the Dominion of Canada on its formation. Most of the present population have been born in the province, but their ancestors were immigrants from different parts of Great Britain. Living within the sound of the sea, and near a coast indented with many good harbours, they naturally turn to the ocean for their means of subsistence. The fisheries therefore, especially of cod and lobsters, form the most important industry in the province. More than 14,000 boats and vessels and 27,000 men are engaged in this industry.

In the northern part of the province coal mines are extensively worked, the total amount raised in 1901 being 4,200,000 tons, while in the southern portion of the province gold is mined. Iron and gypsum are the other chief mineral products.

Halifax, the capital, is situated about the middle of the south-east coast, on a magnificent natural harbour, the nearest to Europe on this continent that is open and free of ice all the year round. It is an important coaling station for the British fleet, and is strongly fortified and garrisoned by Imperial troops.

PRINCE EDWARD ISLAND

Position and Surface.—Prince Edward Island, the smallest province in the Dominion of Canada, lies within the Gulf of St. Lawrence, between latitude 46° and 47° N., being separated from New Brunswick and Nova Scotia by Northumberland Strait which is only ten miles wide at its narrowest point. The island is 145 miles long, with a breadth of from 5 to 35 miles. Its coast is very irregular, projecting in long low points, and cut into deep bays, many of which have bars of sand stretching across them, though these bars are usually broken through sufficiently to allow vessels of light draught to enter. The island is underlain by soft red sandstones of Permo-Carboniferous and Triassic age, which weather down readily and evenly, and on this account the surface is without strongly marked prominences and nowhere rises more than 500 feet above the sea.

Resources and People.—The soil, like the underlying rock, is red in colour, and is very fertile, so that agriculture occupies the attention of the people to a large extent. Potatoes and oats are the chief products, but cheese and butter are also now becoming important. Many fine horses are also reared. Next to agriculture fishing is the chief industry, the lobster-fishing being the most important, while the oyster-beds furnish more than half the oysters collected in Canada. The province is the most thickly peopled in the Dominion, the average density being 54 to the square mile. The people are mostly native born, but about half are of Scottish descent. The province joined the Dominion in 1873. *Charlotte-town*, the capital, is situated on an excellent harbour on the south coast.

NEW BRUNSWICK

Position and Surface.—New Brunswick is roughly rectangular in shape with a greatest length from north to south of 205 miles. Exclusive of islands it lies between 45° and 48° N., being thus in the same latitude as central France, or southern Hungary. It has land boundaries with the province of Quebec on the north, the State of Maine on the west, and the province of Nova Scotia at the isthmus of Chignecto in the east. Its coasts face the Gulf of St. Lawrence and the Bay of Fundy. There are many good harbours, though the east coast is for the most part low, with outlying sandy shoals. Bay Chaleur, to the north, is 85 miles long, and free of rock and shoals, while the Bay of Fundy on the south is noted as having the highest tides in the world, the spring tides at the head of the bay rising 50 feet.

The central tract, underlain by rocks of Carboniferous age, is a low-lying plain, seldom rising more than a few hundred feet above the sea, and sloping gently towards the east coast. Both it, and much of the higher country in the north-west portion of the province, underlain by Silurian rocks, are well adapted for agriculture, but as yet only a small portion is cultivated. The country underlain by disturbed and altered crystalline and Cambrian rocks along the south coast, and stretching diagonally north-eastward through the province, is much more rugged and broken, the latter belt rising into numerous high peaks; Bald Mountain, the highest, reaches 2,470 feet. The whole country, both highlands and lowlands, is almost everywhere covered with a forest of spruce (*Picea alba*).

Rivers.—New Brunswick is a land of many and beautiful rivers, which flow either southward into the Bay of Fundy or eastward into the Gulf of St. Lawrence; several of them are navigable by river steamers. The St. John, 450 miles long, rises in the State of Maine, and at its mouth it flows through a rocky gap only 400 feet in width, where, at ebb tide, there is a heavy fall towards the harbour, while at flood tide there is a fall in the opposite direction. Four times a day, at half tide, ships can pass in or out through the narrow gap. Above this reversible fall the river is navigable for river craft for 212 miles to Grand Falls.

People and Resources.—The province was originally settled by the French, but the present inhabitants are chiefly descendants of British emigrants. Hitherto the forests have been the chief sources of wealth to the people. Pine was formerly abundant, but has now become very scarce, the forests being almost entirely composed of spruce. Only the larger trees are cut, while the smaller ones are carefully preserved, so that in this way any district can be economically "cut over" every ten or fifteen years. Fishing is the industry of second importance, though it is chiefly carried out along the shore, but few vessels being engaged in deep-sea fishing. A considerable number of people are engaged in agriculture, all the ordinary products of temperate climates being produced.

Towns.—*St. John*, the largest and most important commercial city in the province, is situated on a rocky peninsula where the St. John river flows into the Bay of Fundy. It has an excellent harbour, open all the year round, for in winter it is kept clear of ice by the tides, which here rise 25 feet. It is thus busy in winter when the St. Lawrence is frozen. In the days of wooden ships St. John was a famous ship-building town, and even now a very large number of vessels are owned in the city. *Fredericton*, the capital of the province, is situated on the St. John river, 86 miles from its mouth, and the tide ascends the river to a short distance above it. *Moncton*, on the Petitcodiac river, is a considerable manufacturing centre.

QUEBEC

Position and Boundaries.—The province of Quebec lies between 59° and 79½° W., and between 45° and 53° N. It is bounded on the west by the province of Ontario and a short section of the east coast of Hudson Bay ; on the south by the States of New York, Vermont, New Hampshire, and Maine, and the province of New Brunswick ; on the east by the Gulf of St. Lawrence and that portion of Labrador attached to Newfoundland ; and on the north by the district of Ungava. Its total area is about one-sixth less than the combined areas of France and Germany.

Its coast line, with the exception of 100 miles on Hudson Bay, is entirely confined to the Gulf and Estuary of the St. Lawrence. The north shore, from the Strait of Belle Isle westward, is bold, rocky, and quite bare of trees as far as Cape Whittle, beyond which it becomes slightly lower ; trees appear in some of the valleys, and in a few places small patches of land have been brought under cultivation. Close to the shore are many bare rocky islands. The south shore of the estuary is formed of bold, rocky hills, most of which are covered with forest.

Of the islands included in the province the Magdalens, a cluster of rocky knolls, often connected by bars of sand, very dangerous to shipping, rise in the centre of the southern half of the Gulf of St. Lawrence. Anticosti, which lies in the mouth of the estuary of the St. Lawrence, is 140 miles long, but has no good harbours, and is almost uninhabited.

Configuration.—The province is naturally divided into three parts.

(1) The Laurentian Plateau is an undulating rocky country north of the St. Lawrence, lying between 500 and 2,000 feet above the sea, chiefly underlain by granites, gneisses, and other rocks of Laurentian age, while here and there are areas underlain by highly altered sediments of Huronian age. In the vicinity of lakes St. John and Mistassini small outliers of comparatively unaltered Cambrian and Silurian rocks are also included. The region has all been severely glaciated and there is little residuary soil remaining anywhere. The summits of the low, rounded hills are bare, while the depressions are either occupied by irregular lakes of beautifully clear water, or are filled with stony clay,

which is usually covered with a scattered and stunted forest of spruce and larch, and a deep bed of moss. On the better-drained land, along the streams and lakes there are often extensive forests of large pine and spruce. Seen from the valley of the St. Lawrence the edge of this plateau has the appearance of a range of low rounded mountains, to which the name Laurentide Mountains has been applied. Among the highest points are Les Eboulements, 2,547 feet, and Trembling Mountain, 2,380 feet.

The streams flowing from the small lakes form a succession of quiet, lake-like reaches of water separated by short, rapid *chûtes* or falls. This feature, which is characteristic of most of the streams throughout the great Archæan continental nucleus, has rendered it possible to travel very extensively in canoes or small boats, which with their cargoes may be carried on "portages" over narrow rocky ridges, and past intervening falls. Most of the streams flowing southward to the St. Lawrence are of this type until they reach the edge of the plateau, or "Fall line," where they plunge in one or more heavy falls to the plains below. Montmorency Fall, near Quebec, 224 feet high, is a fine example of these cataracts.

(2) The St. Lawrence Plain has an area within the province of about 10,000 square miles. It is a long and comparatively narrow belt between the foot of the Laurentian Plateau and the highlands south of the river. Beginning a short distance below the city of Quebec it gradually rises, until, at the west end of the province, it has a maximum elevation of between 300 and 400 feet above the sea. It is underlain by more or less flat-lying Silurian limestones and sandstones. Towards the close of the Glacial Epoch, when the land was much lower than it is at present, the estuary of the St. Lawrence extended far beyond the site of the present city of Montreal, and a varying thickness of sand and clay was deposited in it. Since the land has been again uplifted these sands and clays form the fertile soil on which the agricultural prosperity of the province depends. On this plain a few hills of trappæan rock, such as Mount Royal behind Montreal, rise above the general level.

(3) The Highlands south of the St. Lawrence form the northern continuation of the Appalachian Chain which extends northward through the eastern United States. They are known as the Notre-Dame Mountains in the southern portion of the province, and the Shickshocks in the Gaspé peninsula, the highest points in the latter portion of the range rising to nearly 4,000 feet. They are formed of parallel ridges of rock, usually standing at high angles, and varying in age from Archæan up to Devonian. Much of the country is thickly forested. South of the St. Lawrence, lakes are not numerous and all the principal streams run in the moderately high country beyond the Notre-Dame and Shickshock Mountains and flow northward through these mountains in deep, narrow channels.

Climate.—The climate is continental. The winters are clear, with a mean temperature of 14° F., while the summers are warm and bright, with a mean temperature of 60° F. The average precipitation is about

36 inches per annum. In the southern portion of the province all the ordinary cereals usually grown in temperate climates come to perfection.

History and People.—The discovery of Quebec dates from 1534, when Jacques Cartier entered the St. Lawrence river, but it was not until 1608, when the city of Quebec was founded as a fur-trading station, that any successful attempt was made at settlement. From that time onwards for a century and a half, settlers from France spread over the country, most of whom were engaged in the double occupation of collecting rich furs from the Indian hunters, and clearing and tilling the fertile soil. In 1760, during the Seven Years' War, the country fell into the hands of the British through the capture of Quebec by Wolfe. In 1774 the French, who at that time numbered 70,000, were assured by the "Quebec Act" the right to be governed by their own civil laws, which right they still enjoy. Eighty-five per cent. of the people of Quebec province are of French race and Roman Catholic religion, and the French language is used officially as well as English.

Resources.—Most of the population are engaged in agriculture; oats, barley, wheat, maize, hay and tobacco are the chief products, while fruits, such as apples, pears and plums, are extensively grown. Horses and cattle are also raised in large numbers, and much attention is paid to the making of cheese and butter. The timber industry is next in importance to agriculture, white pine, spruce and larch being the principal woods brought into the market. Fishing is important in the Gulf of St. Lawrence. Gold is found in alluvial deposits on the Chaudière river. Asbestos is largely mined in the country south of the St. Lawrence, while copper, iron, mica and graphite are also worked to some extent.

Towns.—*Montreal*, founded in 1642, is situated on an island at the junction of the Ottawa and the St. Lawrence rivers at the head of ocean navigation, any vessel that can enter the harbour of New York or Boston being able to steam up to its wharves. The extensive system of inland navigation, which reaches into the very heart of the continent, begins above the city, and the St. Lawrence is crossed by its first bridge. It is the principal seaport, and the largest city in the Dominion, and is the main eastern terminus of the Grand Trunk and Canadian Pacific railways. It is an important manufacturing centre. The population is more than half of French extraction.

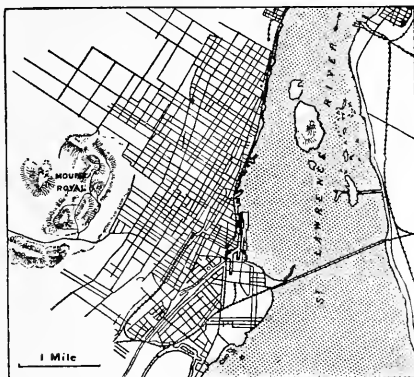


FIG. 342.—Site of *Montreal*.

Quebec, one of the oldest cities on the continent, was founded by Champlain in 1608. The present city is situated partly on a bold promontory on the north side of the St. Lawrence, and partly at the foot of the cliffs close to the river bank. In front of it is a magnificent basin, in which the largest ships afloat can ride in safety. It is the capital of the province, has beautiful parliament buildings, an important Roman Catholic university, and its citadel, situated on the summit of the rocky cliff overlooking the river, has often been spoken of as the "Gibraltar of America." The population is mostly of French descent, and

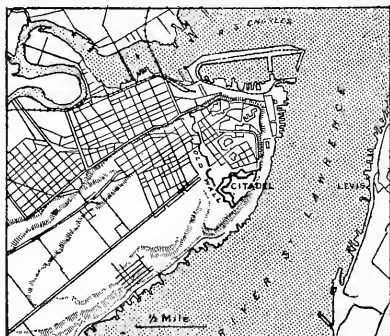


FIG. 343.—Site of Quebec.

French is more spoken than English. *Hull*, on the Ottawa river, and *Sherbrooke*, near Montreal but south of the St. Lawrence, are also thriving manufacturing towns.

ONTARIO

Position and Boundaries.—The province of Ontario lies between 42° and 52° N., and 74° and 95° W. It is bounded on the south and south-west by the States of New York, Michigan, and Minnesota; on the east by the province of Quebec, and on the north and north-west by the district of Keewatin. Its total area is somewhat larger than either France or Germany, and its greatest length from east to west is about 1,000 miles.

The province lies almost entirely inland, for the only place where it reaches the sea is on the shallow coast of Hudson Bay, with no harbours that will accommodate large ocean-going vessels. But most of its southern border lies along the Great Lakes, which, with their connecting rivers, give it a shore line, accessible for about eight months of the year, of 1,700 miles. The steamer traffic on the great lakes may be judged from the fact that a greater tonnage passes through the "Soo" canals, which avoid the rapids at Sault St. Marie between Lake Huron and Lake Superior, than through the Suez Canal. The Canadian shores of Lakes Ontario, Erie, and part of Huron are low and moderately regular. The northern shore of Lake Huron lies along the edge of the Laurentian Plateau, and is fringed



FIG. 344.—The "Soo" Canals.

with a vast number of small rocky islands ; the northern shore of Lake Superior is very bold, with deep bays and comparatively few islands, all of which are rugged and picturesque.

Configuration.—The surface contour is but slightly accentuated, most of it being less than 1,200 feet above the sea, while very few, if any, points rise to a height of 2,000 feet. It is divided naturally into four main subdivisions. (1) A relatively small area sloping gently northward towards Hudson Bay, and underlain by flat-lying Silurian and Devonian limestones. This is very largely covered with swamp or morass, and much of it is thinly wooded with small spruce and larch. Except a few fur-traders and missionaries it has no white inhabitants. (2) The Laurentian Plateau, a continuation westward of the same region in the province of Quebec, forms by far the largest part of the province, though most of it is yet a wilderness. It is almost entirely underlain by Laurentian and Huronian rocks intricately folded and squeezed together, the former being essentially granitic in type. The Huronian rocks consist of sandstones and clays associated with traps and other igneous and intrusive rocks, and are of especial importance on account of the rich minerals associated with them. Where the character of the rock varies greatly within comparatively short distances, as near the north shore of Lake Superior, there are high hills and deep valleys, but in other places the surface is mamillated with many low rounded hills and shallow rock-bound basins filled with clear water or mossy swamps. Usually the summits of the hills are almost naked rock, supporting but a stunted forest growth, the valuable forests of spruce and pine being confined to the richer and moderately well-drained valleys ; but near the great lakes the rock is often covered by extensive deposits of sand and clay, laid down in the beds of these lakes when, towards the close of the Glacial Epoch, their waters stood at much higher levels than at present, and on these lacustral deposits grow some of the finest pine forests in Canada. The southern end of the Laurentian Plateau crosses the Ottawa river at the Chats Rapids and strikes southwards to the Thousand Islands on the St. Lawrence. (3) East of this boundary comes the western extension of the St. Lawrence Plain underlain by flat-lying Cambro-Silurian rocks, over most of which is a Pleistocene deposit of marine sands and clays. As yet it is not very thickly settled except along the banks of the rivers. (4) From the Thousand Islands the southern edge of the Laurentian Plateau strikes westward to Matchedash Bay, at the south-eastern extremity of Georgian Bay, and south of this line is the district known as the Ontario peninsula which is the most fertile and thickly peopled portion of Canada. It is underlain by flat-lying Silurian and Devonian rocks, chiefly limestones, over which there is almost everywhere spread a covering of till or glacial detritus from the old northern ice-sheets ; this till forms some of the richest soil to be found on the continent. In places the till is again overlaid by lacustral deposits formed in the beds of the great post-glacial lakes. This district is divided by

the Niagara escarpment, a bold cliff of Silurian shales and limestones, which crosses the Niagara river at Queenston, skirts the south shore of Lake Ontario to Hamilton, and thence strikes northward to the Bruce Peninsula, between Lake Huron and Georgian Bay, finally forming the backbone of Manitoulin Island in Lake Huron.

Smaller Lakes and Rivers.—Lake Nipigon, with an area of 1,450 square miles, is probably the largest of the many lakes occupying depressions in the Laurentian Plateau, while the Lake of the Woods (Fig. 47), on the extreme western edge of the province, is of about equal size. Along the edge of the Laurentian Plateau a narrow chain of lakes has been formed, among which are those of Balsam and Scugog. In the Ontario peninsula, north of the Niagara escarpment, there are a few very picturesque lakes, Lake Simcoe being the largest, and well known as a summer resort.

The streams of Ontario province belong to three different drainage-areas—(1) those flowing southward into the great lakes; (2) northward into Hudson Bay, these being the longest in the province; and (3) westward into Lake Winnipeg.

History and Resources.—Ontario was first settled in 1776, after the close of the American Revolution, by United Empire Loyalists, men who had left the United States, and their property there, for the love of the United Kingdom and British institutions. That patriotism was strengthened in 1812 when the armies of the United States invaded the country and were repulsed on every side after heavy loss. In 1791 the district was erected into a province, and since that time the population has grown quietly, mainly in the peninsula. Four-fifths of the inhabitants are Canadian born.

A large number are engaged in agriculture, farming being the most important industry in the province. Wheat, oats, barley, maize, potatoes and hay are the principal crops. Stock-raising is also extensively carried on, and wool is of some importance. Cheese-making and dairying are also great and growing industries. Fruit is extensively grown, the principal kinds being apples, pears, peaches, plums and grapes. The chief fruit districts are in the peninsula near the shores of the great lakes. Lumbering is next in importance to agriculture, the timber-lands being leased for this purpose by the Government to private companies or individuals. The fisheries are confined to the great lakes where about 3,000 men are employed.

With the exception of petroleum, the mineral industries of the province are yet in their infancy. Nickel ores occur in extensive deposits near Sudbury on the line of the Canadian Pacific Railway, and an almost unlimited supply of the metal could be obtained if there were a sufficient demand. Copper is usually associated with the nickel in these ores. Gold is found in the Huronian rocks of the western portion of the province, and it is not improbable that many rich gold mines will soon be worked there.

Natural gas exists at several places in the southern portion of the peninsula. Salt and gypsum are also produced in considerable quantity.

Towns.—*Ottawa*, the capital of the Dominion, is beautifully situated on the south bank of the Ottawa river just below the Chaudière Falls. The Dominion Government buildings are of imposing character and finely situated. Ottawa has the most important lumber interests of any city in Canada. Several railways pass through it, and the Rideau Canal joins it to Kingston on Lake Ontario. *Toronto* is both the commercial and political capital of the province. It is built on a series of low terraces on the north shore of Lake Ontario between the mouths of the Don and Humber rivers, and in front of it is an excellent harbour about $3\frac{1}{2}$ square miles in extent, formed by a long sandy island which projects westward from the foot of the cliffs at Scarboro' Heights. It was founded by Governor Simcoe in 1793, on the site of an old French fort that had been built forty-four years before. It is the seat of numerous manufactories, several large industrial institutions, and being an important railway terminus is the principal distributing centre of the province. It is also a banking centre, many of the largest financial institutions in the Dominion making it their headquarters. *Hamilton*, situated at the head of a sheltered bay at the west end of Lake Ontario, is a manufacturing town. *London* is situated on the Thames river, in the centre of one of the finest farming districts in the province. *Kingston*, at the east end of Lake Ontario, is the oldest city in the province, and besides other educational institutions it contains a military college.

MANITOBA

Position and Surface.—The province of Manitoba lies in the very centre of the continent, being almost equidistant from the Atlantic and Pacific coasts, and from the Arctic Sea and the Gulf of Mexico. In outline it is almost square, with sides about 270 miles in length. It extends along the 49th parallel of latitude, which is here the boundary with the United States (Minnesota and North Dakota) from the Lake of the Woods westward to the meridian of 101° , which forms the western boundary. On the east it is bordered by Ontario, and the North-West Territories lie on the north and west.

The province falls naturally into three principal divisions, running in a general north-westerly and south-easterly direction. (1) The Laurentian Plateau, which lies east of the east shore of Lake Winnipeg, with its characteristic undulating rocky surface, dotted with small lakes, and traversed by many crooked, irregular streams. It is chiefly underlain by Laurentian rocks of granitic type. (2) The Lacustral Plain, or First Prairie Steppe, which includes rather more than half of the province, occupies part of the basin of an ancient glacial or post-glacial lake, which has been called Lake Agassiz. The thick beds of clay and silt deposited in that lake now form the rich wheat-producing soil of the

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Red River valley. It is almost entirely underlain by flat-lying Silurian and Devonian limestones, and in its southern portion the original inequalities of the rocky surface have been almost entirely levelled up by the lacustral deposits, while further north the rocky surface was more irregular, and was not so completely covered with clay, having long wide ridges and hollows, the most important of the latter being now occupied by Lakes Winnipeg, Winnipegosis, and Manitoba. Much of the country south of these lakes is open grassy prairie, while farther north it is more or less thickly wooded with spruce and poplar. (3) The Manitoba Escarpment borders the lacustral plain on the west, rising from 800 to 1,400 feet above the plain at its base. West of this escarpment comes the Second Prairie Steppe, in which the relief is more strongly pronounced, the rivers often flowing in valleys which they have cut to a depth of several hundred feet, while many of the stony hills are rough and steep. Much of the soil is of excellent quality, and in the southern portion of the province will grow large crops of wheat; further north and on the higher tracts abundant crops of oats, barley, and the more hardy cereals and roots can be grown. This plateau is underlain by soft shales and sandstones of Cretaceous age.

Winnipeg river, a large stream, broken up by many rapids and falls, flows into Lake Winnipeg from the Laurentian plateau on the east. The Red River of the North rises in the United States and flows northward to empty into the south end of the same lake, while its tributary, the Assiniboine, drains much of the western portion of the province.

History and Towns.—The retired employés and dependents of the North-West and Hudson's Bay Fur-trading Companies formed the nucleus of the present population of the province, originally called the "Red River Settlement." In 1870 the population was about 12,000, while in 1901 it had risen to 255,000. Almost all the inhabitants, who include many immigrants from the United States as well as from Europe, derive their support, directly or indirectly, from agriculture. The principal crops are wheat, oats, barley, potatoes and flax, and of these the exports consist mainly of wheat, the arrangements for collecting and transporting which are highly organised. In the more northern parts of the province many farmers devote themselves to raising cattle, and to the making of cheese and butter. White-fish of the finest quality are caught in the large lakes of the province, and of late years the fishing industry has assumed considerable proportions.

Winnipeg, the capital, and chief city of the province, is situated on the level lacustral plain, at the confluence of the Red and Assiniboine rivers. It is the distributing point and commercial focus of the whole of the Canadian North-West, one of the most important stations on the Canadian Pacific Railway, and a railway centre for lines from the United States as well. *Brandon* and *Portage la Prairie* are prosperous towns in the centre of rich wheat-growing districts on the Canadian Pacific line.

BRITISH COLUMBIA

Position and Area.—British Columbia, stretching from the Rocky Mountains to the sea, is the largest province in the Dominion, having an area three times as large as the United Kingdom. Its greatest length, measured in a north-westerly direction, is 1,250 miles. It is bounded on the south by the United States, the parallel of 49° separating it from Montana, Idaho and Washington. On the west the Pacific Ocean, and farther north a narrow strip of the United States territory of Alaska, are the boundaries. On the east and north it is bordered by the North-West Territories, which separate it from the eastern provinces.

Coasts.—Viewed as a whole the coast has a general trend in a north-westerly direction, but in detail it is very irregular, reaching back into deep, narrow fjords, and fringed by a maze of islands of all sizes. The fjords and straits are submerged valleys both in line with and transverse to the general direction of the mountain ranges. Of the fjords, Dr. G. M. Dawson writes: "Their width is usually from one to three miles, their shores rocky and abrupt, and rising towards the heads of the longer fjords into mountains from 6,000 to 8,000 feet in height. The water is deep, usually much too deep for anchorage, but at the head of each arm a delta-flat, formed by an entering river, is commonly found. Many good harbours exist along the coast, but the two best and most important of those on the mainland are Burrard Inlet, upon which the city of Vancouver is built, and Port Simpson, near the northern end of the coast of the province."

Vancouver Island is separated from the mainland by the Strait of Juan de Fuca on the south, and the Strait of Georgia and Queen Charlotte Sound on the north-east, these two being connected by narrow channels which at Seymour Narrows are less than half a mile in width. It has a length of 285 miles, and a greatest width of 80 miles.

Mountains.—British Columbia is essentially a country of mountains. In the portion of the province north of latitude 54°, the breadth of the Cordillera or mountain belt, from south-west to north-east, is about 400 miles. The mountains, as a rule, run in a north-westerly and south-westerly direction, and the two most conspicuous and important ranges run along opposite sides of the rhomb, the Rocky Mountains proper along the eastern side, and the Coast Range along its western side. At the international boundary the Rocky Mountains have an average width of about 60 miles, and many of the peaks reach heights of 10,000 feet, being snow-capped and abounding in fine glaciers. Further north the range decreases both in width and height, until in the vicinity of Peace river, in latitude 56°, it is only 20 miles wide, and but few of its peaks rise above 5,000 or 6,000 feet. This range is composed of stratified limestone, quartzites, and other rocks from Cambrian to Cretaceous; granites and other crystalline rocks are almost entirely absent. The Rocky Mountain range is bounded on the west by the great Columbia-

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Kootenay valley, which in its course north-westward is occupied successively by the upper portions of the Kootenay, Columbia, Fraser, Parsnip, Findlay, and other rivers, which usually break through its western border to the sea. South-west of this great valley are the Selkirk and Gold ranges. The gold and silver recently discovered in southern British Columbia occur in these mountains. Between the Gold and the Coast ranges, the interior plateau attains an average width of 100 miles. To the south, it does not much exceed, on the average, a height of 3,000 feet, but it gradually decreases to 2,000 about latitude 54°, beyond which it is cut off by transverse ranges of mountains. In places it is so deeply dissected by streams and atmospheric agencies that it has lost all semblance of a plain, but in other places there are extensive almost level tracts, among which is much land suitable for ranching and agriculture.

The Coast Range begins about latitude 49°, and runs north-westward, near the coast, for about 900 miles, with an average width of about 100 miles. Many of its summits rise to heights of 7,000 and 8,000 feet, while its submerged valleys form deep fjords. Its seaward slopes, clothed with magnificent forests, rising to snow-capped peaks form some of the grandest scenery in the world. The mountains forming the backbone of Vancouver and Queen Charlotte islands are a subsidiary and partly submerged chain of the main range. The Coast Range is chiefly composed of granitic and highly altered sedimentary rocks.

Hydrography.—In conformity with the structural lines of the country, the numerous lakes are long and narrow, lying either between the mountain ranges, or in the bottoms of the deeper parts of river valleys, which have been obstructed in some way. The Peace and Liard rivers rise in the north-eastern part of the province, and drain a large area eastward into the Mackenzie river. A small area in the extreme northern portion is drained by the headwaters of the Yukon. The remaining rivers flow towards the Pacific coast in very irregular channels, running between and across the ranges, and often doubling back parallel to their upper courses. Of these the principal is the Fraser, which rises on the western slopes of the Rocky Mountains, close to the source of the Athabasca, and flows at first north-westward, and then southward, to empty into the Strait of Georgia, having a total length of about 750 miles. The upper waters of the Columbia river flow through the province, the river being twice crossed by the Canadian Pacific Railway. The Skeena and the Stikine are both large rivers, navigable for small steamers in their lower courses.

Climate.—The climate varies from temperate insular on the coast and islands, to extreme continental on the high interior uplands. The total annual precipitation in the valleys of the interior is about 15 inches; at Victoria it is 40 inches, while in some parts of the coast to the north it exceeds 100 inches. It is thus, in some parts of the interior, possible to grow crops only with the aid of irrigation, while along portions

of the coast the excessive humidity practically precludes agriculture (see Fig. 338).

History and People.—The coast of British Columbia was discovered and partly explored by Spanish voyagers, and by Cook in the course of his last voyage in 1778. In 1793 Alexander Mackenzie first crossed the interior on his journey from Lake Athabasca to the Pacific Ocean, and early in the nineteenth century David Thompson explored and opened up trade routes into the country from the upper waters of the Saskatchewan and Athabasca rivers. In 1849 Vancouver Island was granted a Governor, and in 1856 it elected its first legislative body. The discovery of gold in 1857 brought a rush of population to the province, and in 1866 Vancouver Island and the mainland were united under the name British Columbia. In 1871 it entered the federal union of the Dominion, one condition of federation being the construction of a railway to the eastern provinces.

Mines.—The wealth of the people depends very largely on mineral products. Gold was first discovered in auriferous sands and gravels on the Thompson and Fraser rivers and their tributaries in 1857 and 1858, and in the early "60's" stories of the rich finds in the remote Cariboo district were common throughout the English-speaking world. Until recently this gold was almost entirely obtained from placer diggings, but rich gold-bearing lodes have been found in the West Kootenay district, which has consequently been made accessible by railways and steamboats, so that the dwindling placer mines of the Cariboo district are thrown in the shade by the rich and rapidly developing lode mines of the south. In 1897, silver derived almost entirely from the silver-lead mines of the West Kootenay district, jumped to the first place among the mineral products, the total silver product exceeding in value that of gold. The amount of lead produced is very considerable, and some copper also is obtained. The coal mines of Vancouver Island have long held an important place on the Pacific coast, as they not only supply the province itself, but lead the market in the coast cities of the adjoining republic. Large coal-fields also exist in Queen Charlotte Islands, and in the interior, notably in the Crow's Nest Pass of the Rocky Mountains, through which a railway has been carried to the Kootenay gold and silver mining districts.

Resources and Towns.—Throughout the province there is a vast extent of country covered with forest, chiefly of conifers, among which the most valuable tree is the Douglas fir. Along the coast, and on Vancouver Island, there are many saw-mills which are supplied with this fir from the adjacent forests, and from which lumber is largely exported. The fisheries are another important source of wealth to the people. Salmon abound in many of the streams, and are caught and put up in cans for export in enormous quantities. Halibut, herring, rock-cod, &c., are also caught off the coast. The pelagic sealing fleet is also largely owned in this province.

There is much good agricultural land in the southern portion of the

interior plateau, on the deltas, and in the valleys of the principal rivers where, in addition to cereal crops, fruit of many kinds is now beginning to be successfully cultivated. Difficulties of transport have heretofore limited farming, but stock-raising is an industry of considerable importance in the southern part of the interior.

Victoria, the capital of the province, is situated on a good harbour at the south end of Vancouver Island. The provincial Parliament House is one of the finest buildings in Canada. Three miles to the west is the great naval harbour *Esquimalt*, the principal station for the North Pacific Squadron of the British fleet. *Vancouver*, the western terminus of the Canadian Pacific Railway, is situated on the south shore of Burrard Inlet, one of the



FIG 345.—Vancouver and Victoria, B.C.

best harbours on the Pacific coast, and the point of departure of regular lines of steamers to Japan and New Zealand. *New Westminster*, the first capital of the mainland province, a short distance up the Fraser river, was founded in 1858. *Rossland*, on the gold-fields near the Columbia river, has sprung into existence as a city second in population only to Vancouver and

Victoria, and provided with railway communication with the United States. In all the towns of the province there is a large Chinese element, most of the domestic servants and many labourers being Chinamen. Japanese immigrants are also met with ; but in spite of the mixture of races British Columbia is perhaps the most English of all the provinces of Canada in the life of the people as well as in the climate.

THE TERRITORIES

Territories.—Outside of the organised provinces of the Dominion there are vast areas which have long been known as the North-East and North-West Territories. Recently these have been divided into districts, some of which are provided with representative government, while others, whose only inhabitants are a few scattered Indian hunters, are governed by the Dominion Parliament at Ottawa. These districts are nine in number.

Ungava.—The district of Ungava comprises the northern portion of the Labrador peninsula, north of the province of Quebec, except the eastern strip of coast which for 700 miles is under the jurisdiction of Newfoundland. The western side of the peninsula is the rocky eastern shore of Hudson Bay, indented by many deep narrow bays, and skirted by a large number of rocky islands. The interior is a gently undulating plateau underlain by Archean and highly altered Cambrian rocks. The main watershed is about the middle of the southern boundary of the district,

and from there the rivers flow northward, westward, and eastward, and also southward through the province of Quebec. On the long Hamilton river, which flows south-eastward to the Atlantic, are the Grand, or McLean Falls, where the stream plunges 300 feet over a cliff into a narrow rocky gorge. The country is more or less sparsely wooded as far north as the south end of Ungava Bay.

Keewatin.—The south-western and western sides of Hudson Bay, and the country adjoining, are comprised within the great district of Keewatin. Its coast on Hudson Bay is exceedingly low and flat south of 61° N. lat., while north of that latitude it becomes much more bold and rocky. The lagoon at the mouth of the Churchill river is the only good harbour on the more southern portion of this coast, and it remains unfrozen on the average for five months in the year. Most of the country is underlain by Archæan rocks. South of 60° N. the district is generally forested, scattered woods of small black spruce and larch growing on swampy tracts. North of 60° N. it is almost entirely treeless, often forming an undulating stony plain, thinly covered with short grasses and sedges. Countless herds of a small variety of reindeer roam over these plains. These are almost the only living creatures in this country, the fur-bearing animals being confined to the forests further south. The district is entirely beyond the limits of settlement, and, as in Ungava, except a few white fur-traders the only inhabitants are Indians and Eskimo.

The Organised Districts.—Assiniboia, Saskatchewan, and Alberta, lie between Manitoba and part of Keewatin on the east, and British Columbia on the west, and between latitudes 49° and 55°. They are spoken of as the organised districts, for they have a Lieutenant-Governor, an elected Parliament, and an Executive Council to attend to their local affairs, while at the same time they have representatives in both Houses of the Dominion Parliament in Ottawa.

At its north-eastern corner the district of Saskatchewan touches the hummocky Laurentian plateau, and is underlain by rocks of Laurentian and Huronian age. South-west of this is a narrow strip underlain by Silurian limestones, while the whole remaining portion, to the foot of the steep cliffs of the Rocky Mountains, is underlain by soft clays and sandstones of Cretaceous and Tertiary age, often covered by a thick mantle of drift. The rise from the Archæan plateau to the foot of the mountains averages $5\frac{1}{2}$ feet to the mile. This rise is not regular, though it indicates the general slope of the country, but is most pronounced along the line of the Manitoba escarpment which marks approximately the eastern edge of the Cretaceous rocks, and along the Missouri Côteau, which separates the second from the third or highest prairie steppe.

The Saskatchewan river, with its tributaries, drains the greater part of these districts. Most of its branches rise on the eastern slopes of the Rocky Mountains, some of the more northern ones being fed by glaciers, and, flowing eastward, unite into one great stream which empties into the

north end of Lake Winnipeg. At the mouth of the river is a heavy rapid, with a descent of seventy feet, but above this the main stream is navigable for river-steamers for 900 miles, while the south branch is navigable for 400 miles above its confluence. A small area in the south is drained southward towards the Missouri, while north of latitude 54° most of the country is drained northward either to the Mackenzie or to the Churchill rivers. The surface is very generally dotted with small lakes and ponds, usually shallow, which lie in hollows in the general covering of drift. Many of these are without outlet, and some are quite saline, chiefly from the presence of sulphate of soda.

The whole of Assiniboia, and large tracts in the south of Saskatchewan and Alberta are treeless, except in the deep valleys, consisting of grassy plains or prairies, which usually extend to the horizon on every side. Or the level plain may be varied here and there by sandy or stony hills, appearing as high ridges in the distance, but on closer approach dwindling to grassy downs. A few plateau-like elevations, such as the Cypress and Hand Hills, rise 1,000 feet or more above the surrounding plain. The total area of this prairie country north of 49° N., including the prairie portion of Manitoba, is about 193,000 square miles. North of the treeless prairies comes a belt of varying width, consisting of open grassy glades alternating with groves of poplar, north of which again is the coniferous forest, composed chiefly of spruce and larch.

People and Towns.—The inhabitants are partly Indians, while the remainder are immigrants from many parts of Europe and the eastern provinces of the Dominion. The attention of the people is almost entirely devoted to agriculture and raising live stock. In the more eastern parts of Assiniboia and in the partly wooded country near the banks of the Saskatchewan river, wheat, barley, and oats are grown to great perfection. In the drier country farther south and west, most of the people are engaged in the raising of cattle, horses and sheep. Extensive beds of coal and lignite underlie large areas, ensuring an abundant supply of fuel.

Regina, the capital of the North-West Territories, stands on a level plain on the line of the Canadian Pacific Railway and is the head-quarters of the North-West Mounted Police, who keep order over the whole region. *Calgary*, also on the railway, in the southern portion of Alberta, is the centre of the ranching country, and its handsome stone-built houses contrast with the wooden or iron dwellings common in newly-settled districts. A branch line runs north to *Edmonton*, on the Saskatchewan.

North-Western Districts.—The four districts of Athabasca, Mackenzie, Yukon, and Franklin, together make up a full third of the Dominion of Canada. With the exception of Yukon, all of these districts are without white inhabitants, except a few fur-traders who have gone out into the wilderness to barter with the Indian hunters. The Indian population is estimated at about 32,000. Athabasca and Mackenzie are essentially

similar in character. Their eastern half lies on the north-western extension of the Archæan plateau. Their western half is underlain by stratified limestones, shales, and sandstones, varying in age from Devonian up to Miocene. The north-eastern corner of Mackenzie lies within the area of the Barren Lands, beyond the limit of the growth of trees, while most of the remainder is covered with a forest of stunted spruce and larch, of no commercial value. In the south-western part of Athabasca there are open poplar woods, with some rather large tracts of open grassy prairie. Some portions of the country west of Athabasca have a height of 3,000 feet, while east of that river there are elevations of about 1,700 feet. From there the country has a gentle and fairly regular slope northward through Mackenzie to the Arctic Sea. The most conspicuous breaks in the general level of this plain are the cliffs on the north shore of Great Slave Lake, and the Copper Mountains, near the Coppermine river. The Athabasca-Mackenzie river traverses the whole length of the district. The furs secured by the Indians throughout the forests of this northern country are its principal source of wealth. Fish abound in the lakes and streams and furnish valuable supplies of food for the traders and Indians. Franklin consists of the islands of the Arctic Archipelago, varying in size from Baffin Land down to small reefs. These are underlain generally by rocks ranging in age from Archæan up to Carboniferous, the latter containing some good seams of coal, while in a few places Mesozoic and Tertiary rocks have been recognised. The greater part of the surface is not very high, and in general character is similar to the Barren Lands of the continent. Here the musk ox, polar bear, and reindeer have, as yet, a safe retreat. A few Eskimo are now the only inhabitants.

Yukon.—Yukon Territory lies between the northern limit of British Columbia and the Arctic Sea, and between the summit of the Rocky Mountains on the east, and the boundary of Alaska on the west. In general character it is a northern extension of the mountainous region of British Columbia, though the ranges are not so distinct or regular. The streams which drain it are nearly all tributary to one great river, the Yukon, which is navigable by river steamers for 2,400 miles from one of its sources in Teslin Lake to the Bering Sea. Since 1897 discoveries of rich deposits of placer gold on the tributaries of the Yukon have attracted a large number of prospectors and miners from all parts of the world to this remote region, where the gold of the Klondike river has led to the growth of the town of *Dawson*. The gold produced in 1900 and 1901 averaged £4,000,000 per annum in value. Access to Dawson is had by rail from the United States port of Skagway in Alaska over the mountains to the navigable upper waters of the Yukon. Yukon Territory, in consequence of its position in relation to the Pacific and the ameliorating effects of the prevalent westerly winds, is by no means so rigorous in its

climate as those parts of the continent further to the east. Except in the extreme north, the lowlands are generally wooded, and hardy crops may be grown with some chance of success almost to the Arctic Circle.

STATISTICS.

AREA AND POPULATION OF THE DOMINION OF CANADA.

Provinces.	Area in square miles.	1881.	Population.	1891.	1901.
Novia Scotia	20,600	449,572	..	459,396	.. 459,574
Prince Edward Island	2,000	108,891	..	109,078	.. 103,259
New Brunswick	28,200	321,233	..	321,263	.. 331,120
Quebec	347,350	1,359,027	..	1,488,535	.. 1,648,898
Ontario	222,000	1,926,922	..	2,114,321	.. 2,182,947
Manitoba	73,960	62,260	..	152,506	.. 255,211
British Columbia	383,300	49,459	..	98,173	.. 178,657
Territories.					
Assiniboia	89,535	56,446	..	66,799	.. 67,385
Saskatchewan	107,092				.. 25,079
Alberta	109,000				.. 65,876
Keewatin	756,000				.. 8,546
Athabasca	251,300				.. 6,615
Mackenzie	563,200				.. 5,216
Yukon	198,300				.. 27,218
Ungava	456,000				.. 5,113
Franklin	Unknown				.. ..
Great Lakes of St. Lawrence	47,400	..	..	..	..
Totals	3,653,950	4,324,810	..	4,833,239	.. 5,371,315

POPULATION OF CHIEF TOWNS.

	1881.	1891.	1901.		1881.	1891.	1901.
Montreal ..	155,237	216,650	267,730	St. John, N.B. ..	41,353	39,179	49,711
Toronto ..	96,196	181,220	208,040	London, Ont. ..	26,206	31,077	37,081
Quebec ..	62,449	63,090	68,840	Vancouver, B.C. ..	—	13,685	26,133
Ottawa ..	31,307	44,154	59,928	St. Henri ..	6,415	13,413	21,192
Hamilton ..	35,960	48,980	52,634	Victoria, B.C. ..	5,925	16,841	20,816
Winnipeg ..	7,985	25,642	42,340	Kingston ..	14,091	19,263	17,961
Halifax ..	36,100	38,556	40,832	Brantford ..	9,616	12,753	16,619

AREA AND ELEVATION ABOVE SEA OF THE LARGEST LAKES.

	Area in square miles.	Elevation in feet.		Area in square miles.	Elevation in feet.
Superior ..	31,200	600.5	Ontario ..	7,240	245.5
Huron ..	23,800	580	Athabasca ..	2,850	690
Great Bear ..	11,400	340	Winnipegosis ..	2,000	828
Great Slave ..	10,100	520	Manitoba ..	1,710	810
Erie ..	9,960	572	Nepigon ..	1,450	850
Winnipeg ..	9,400	710			

AVERAGE ANNUAL TRADE (*in pounds sterling*).

	1871-75.	1881-85.	1891-95.
Exports	16,500,000	19,200,000	22,500,000
Imports	23,500,000	23,300,000	24,400,000

II.—NEWFOUNDLAND

By J. B. TYRRELL, M.A., B.Sc.,

Formerly of the Geological Survey of Canada.

Coast and Surface.—The large island of Newfoundland, lying across the mouth of the Gulf of St. Lawrence, extends from $46\frac{1}{2}^{\circ}$ to $51\frac{1}{2}^{\circ}$ N. lat., separated from the mainland of Labrador by the Strait of Belle Isle, 12 miles wide, and from Cape Breton by Cabot Strait 60 miles wide.

It is roughly triangular in outline, each of its three sides being between 300 and 400 miles in length; but while the north-western shore is moderately straight, the southern and north-eastern shores are indented by many deep bays, and fringed with a great number of rocky islands, which form many magnificent harbours. The coast is for the most part bold and rocky, and its total length is about 2,000 miles. The large bays usually run in a north-easterly and south-westerly direction, and their shores are broken by many smaller bays. The bays of Notre-Dame and Bonavista on the north-east coast are marvellously fretted by little peninsulas and fringed with small islands. Heart's Content, on the north side of Trinity Bay, is the landing-place of the Atlantic cables. Burin Peninsula, with a length of 82 miles, lies between the great bays of Fortune and Placentia, while the peninsula of Avalon, in the south-east, on which the larger part of the population is settled, is almost cut off from the rest of the island by Placentia Bay on the south and Trinity Bay on the north, the neck of the peninsula being only three miles wide in its narrowest part. St. Mary's Bay and Conception Bay make great indentations into this peninsula.

The interior of Newfoundland is underlain chiefly by Archæan and early Palæozoic rocks, arranged in long folds in a general north-easterly and south-westerly direction, parallel to the north-west coast, the older and harder rocks forming the ridges, while the softer and later rocks occupy the depressions. The Long Range, on the west side, is the highest and most important of the ridges, varying in height from 1,000 to 2,000 feet. The undulating surfaces of the rocky hills are dotted with an immense number of small ponds and lakes, from which flow many brooks to form the larger streams, the most important of which are the Exploits and Sanchau, discharging on the north-east coast, and the Humber river, discharging into the head of the Bay of Islands on the west coast. The tops of the rocky hills and ridges are for the most part scantily wooded or barren, while the river valleys and the land at the head of the deep bays are usually thickly wooded with large and valuable timber, chiefly white pine, spruce, larch and birch.

Climate.—The Arctic current, bearing extensive fields of ice and many icebergs, flows southward past the east side of the island, and tends to lower the temperature in summer, but very extreme temperatures are unknown, the thermometer rarely falling below zero F. or rising above 85° F. Dense fogs often hang over the south and east shores, but these do not extend many miles inland, and the weather in the interior is usually clear and bright.

Resources and Industries.—Though there are large areas of good agricultural land in the interior, it has as yet been almost entirely neglected, for the surrounding ocean contains such an abundance of fish and seals that the catching and curing of them occupies almost the entire attention of the people. Early in March steamers and sailing vessels

put to sea heavily manned, and seek the ice-floes drifting down from the north, on which the seals have brought forth their young. The sealing season lasts from March 16th to April 16th. After the sealing is over the season for cod-fishing begins, and lasts from June to November. The vast

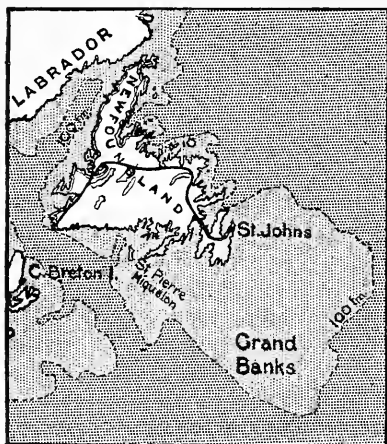


FIG. 346.—Newfoundland and the Grand Banks.
The French shore is shown by a double line.

submarine plateau which extends around the south and east shores of Newfoundland, known as the Grand Banks, and covered with a depth of from 10 to 160 fathoms of water, is the greatest fishing-ground for cod in the world, and ships of many nations congregate there to gather the rich harvest from the sea; and the bold and well-trained sailors from Newfoundland, being nearest to the Grand Banks, and provided with a plentiful supply of bait (capelin, squid, &c.), which swarm on their shores, come in for a full share of this harvest. The fish, when caught, are cleaned, salted and dried in the sun on stages, which

may be seen almost everywhere. Herring, capelin, and other fish are caught in considerable quantity along the shore. Salmon are caught in the rivers, and of late years a considerable industry has grown up in the catching and canning of lobsters. Almost 90 per cent of the exports of Newfoundland consist of the products of the fisheries, more than half being dried codfish.

Iron pyrites, copper and iron ore are the principal minerals at present worked, the first-named being exported to England for the manufacture of sulphuric acid. Coal is reported to exist in considerable quantity, chiefly on the west side of the island, and lead and nickel are also said to occur. The timber is cut to some extent for local use.

Population and History.—Newfoundland was discovered by John Cabot in 1497, at which time it was inhabited by the Beothuks, or Red Indians, a tribe whose exact affinities are now unknown, for the last survivor is supposed to have died in the early part of the nineteenth century. The fame of the cod-fishing off its shores soon spread through the maritime nations of Europe, and many ships from France, Spain, Portugal and England resorted every year to the Grand Banks, using the many harbours of the island as bases of operations. In 1582 an English Governor was appointed, and during the next fifty years several futile attempts were made at colonisation. Then for more than a century



FIG. 347.—The Badge of Newfoundland.

and a half colonisation was discouraged, the English merchants, who were amassing large fortunes by cod-fishing, not wishing to have to compete with inhabitants of Newfoundland. It was not till 1791 that a Supreme Court of Judiciary was erected in the island. At present there is a Governor appointed by the Crown, a Legislative Council, appointed for life by the Governor in Council, and a Legislative Assembly elected for four years by the whole people. The executive is in the hands of a Ministry having the confidence of the Assembly. For administrative purposes the coast of Labrador is considered as part of the colony of Newfoundland.

The usual means of communication between one place and another has been by boats along the coast, but a railway now crosses the island from St. John's to Port aux Basques, passing through the most fertile and well-wooded districts, and it is expected not only to open much of the interior to settlement, but also to form a part of a line of rapid communication between Europe and America.

Towns.—*St. John's*, so called because the harbour was first entered by John Cabot on St. John's Day, is the capital. It is situated on the east side of Avalon Peninsula, at the head of a magnificent land-locked harbour a mile long and half a mile wide, which is entered through a deep, rocky passage only 200 yards wide at its narrowest part. In it the largest ships can ride in safety. It is the centre of the fishing trade of the island, and may become one of the most important ports on the Atlantic seaboard, when the railway across the island is connected by fast steamers with the Canadian railway system, for it is nearer Europe than any other port in America, being only 1,675 miles from Cape Clear on the west coast of Ireland. *Harbour Grace*, the next town in size, stands on Conception Bay.

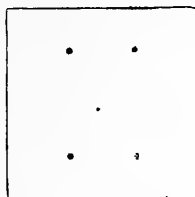


FIG. 348.—Average population of a square mile of Newfoundland.

STATISTICS.

		1891.	1901.
Area of Newfoundland (square miles)	.. .. .	42,200	42,200
„ Labrador (square miles)	.. .. .	119,000	119,000
Population of Newfoundland	.. .. .	197,934	217,037
Density of Population of Newfoundland (per square mile)	.. .. .	4.7	5.2
Population of Labrador	.. .. .	4,106	3,947
„ St. John's	.. .. .	29,007	29,594
„ Harbour Grace	.. .. .	6,466	5,184

ANNUAL TRADE (in pounds sterling).

		1881-85.	1891-95.
Imports	.. .. .	1,630,000	1,400,000
Exports	.. .. .	1,574,000	1,350,000

III.—ST. PIERRE AND MIQUELON

BY M. ZIMMERMANN.*

St. Pierre and Miquelon.—The two little islands of St. Pierre and Miquelon with a permanent population of a few thousand persons, remain

* Translated from the French by the Editor.

in the possession of France as the only relics of the magnificent colonial empire she founded in North America. They lie close to the south of Newfoundland and, small as they are, only 93 square miles, they possess a real importance to the mother country on account of their proximity to the Grand Banks where large fleets of French fishing-boats are engaged in the capture of cod. The islands form the basis of the fish trade with France, and the exports of fish from the port of *St. Pierre*, on the island of the same name, are steadily increasing, their value in 1894 exceeding five million dollars. Miquelon, although the larger island, has very few inhabitants, and the rainy climate with its frequent fogs does not encourage immigration. In connection with these islands France retains certain fishing rights on the west coast of Newfoundland, which on that account is termed the French Shore (Fig. 346).

STATISTICS (1892).

		Area in square miles.		Population.		Density of Population.
St. Pierre	:: ::	10	::	5,700	::	570
Miquelon	:: ::	83	::	550	::	7

IV.—BERMUDA

BY THE EDITOR.

Position and General Character.—A solitary bank rising abruptly from the depths of the North Atlantic in 32° N. and 65° W. bears a group of small islands of remarkable formation known as the Bermudas. Farther

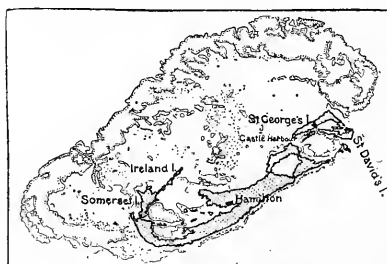


FIG. 349.—Bermuda Islands and reefs. The map includes 30 miles by 20.

north than any other coral islands, they are of coral formation; a consequence of the warm water carried northward by the great oceanic whirl of which the Gulf Stream forms part. The islands occupy a space of only twenty miles by five, but are surrounded, especially on the north and west, by a growing reef through which a few intricate channels admit vessels. Unlike other atolls the

Bermudas are in parts hilly, the heights, which rise to 260 feet, being formed of blown coral sand, cemented by the action of rain into solid rock; they are in fact petrified dunes. The sweeping curve of the hook-shaped main island brings it so close to the smaller members of the group that many of them are reached by bridges or causeways. The situation is as remarkable as the formation. From Bermuda as a centre a radius of 800 miles would sweep the coast of North America from Nova Scotia to Cape Hatteras; and a radius of 1,000 miles would sweep the east coast of Florida and the whole line of the Antilles from Cuba to Antigua. This gives the little

group remarkable strategic value. Another element of importance is the climate, which is remarkably mild and equable. The temperature has never been known to fall below 40° ; the monthly mean of February, the coldest month, is nearly 63° ; that of August, the hottest month, does not exceed 80° . Hence in spite of poor soil the islands have become noted for the growth of early vegetables of excellent quality, and for many subtropical products; the staple crops for export to New York were in 1896, onions, early potatoes, and lily-bulbs. There is no lake nor stream in the islands, and the wells yield somewhat brackish water, so that the inhabitants rely mainly on rain-water caught and stored in cisterns.

History, Government and People.—The group was discovered in 1515 by a Spanish navigator, Bermudez, and from the usual pronunciation of his name it became known as the *Bermoothes*, a form perpetuated by Shakespeare when he laid the scene of "The Tempest" there. In 1609 the shipwreck of Sir George Somers gave them the alternative name of Somers' Islands, and also led directly to the first settlement and colonisation from Virginia and England. Bermuda is now a British colony under a Governor, who is assisted by an Executive and a Legislative Council nominated by him, with an elected Legislative Assembly as a Lower House. Of the population little over one-third is white, the rest being negroes and coloured people as in the West Indies. The main occupation is market gardening, but the increasing use of Bermuda as a winter resort for wealthy Americans is also important. Steamers ply regularly to New York. A telegraph cable connects the islands with Nova Scotia, and may be prolonged southward to the West Indies. Bermuda is an important British naval station for the North American squadron on account of its central position; the approaches to the channels are accordingly fortified, and a garrison of about 1,500 British troops is permanently stationed in this Malta of the western North Atlantic. The chief town is *Hamilton*, situated on the main island.

STATISTICS.

	1885.	1895.
Area of Bermuda (square miles)	20	20
Population	15,036	15,794
Density of population per square mile	751	789
Population of Hamilton (the capital)	2,100	1,296

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The publications of the Canadian Geological Survey contain many valuable reports on exploration in all parts of the Dominion.

CHAPTER XXXIX.—THE UNITED STATES OF AMERICA

BY WILLIAM MORRIS DAVIS,

Professor of Physical Geography in Harvard University.

I.—HISTORICAL AND POLITICAL GEOGRAPHY

Discovery and Settlement.—The New World is fortunate in lying with its lesser highlands towards the narrow Atlantic which separates it from western Europe, the home of active and inventive Caucasians, and in presenting its greater highlands to the broad Pacific, which separates it from eastern Asia, the home of the unprogressive Mongolians ; for to this accident of position—if such it be—the discovery and colonisation of the New World by the best race of the Old World may be ascribed. A century of discovery along the eastern coast led to a century of colonisation, this to a century of rapid colonial growth, and this again to a century of independence and expansion for the middle colonies of the Atlantic border. At the close of these four centuries the United States has become one of the foremost nations of the world in extent, variety, and value of territory, and in number, intelligence, and wealth of population.

The English colonies of the Atlantic coast between the St. Lawrence and Florida were established at first with relation to the harbours that gave protection to the vessels by which intercourse with the mother country was maintained. From the harbour settlements as centres, large areas of land were claimed under the authority of royal grants ; thus the coast was subdivided among a dozen colonies, some of which laid claim to an indefinite extent of inland country. Progress into the interior was in most cases opposed by the aboriginal Americans, of tribal organisation, to whom the name of “Indians” was given by the early discoverers as if to set a lasting mark on their faulty reckoning of longitude. Idealised in romance, too often abused in the rough realities of frontier life, the Indian was a rude savage. He probably lived as closely to his ideas of virtue and duty as the colonists did to theirs, and when fairly treated, as by the Quakers under Penn, he was peaceful ; but the ideas of natives and of new-comers were usually unlike, even irreconcilable. Each one often accused the other of injustice, and the intercourse between them was constantly interrupted by petty warfare, resulting in an aggressive advance of the whites into the lands of the Indians. The progress of the backwoodsman among the Alleghenies in the eighteenth century, of the frontiersman on the prairies, plains and mountains, and of the Indian agent, acting for the

government under profitable contracts in the nineteenth century, does not make a glorious history to review, so far as it deals with native tribes.

Hardly less fortunate than the narrowness of the Atlantic is the northward trend of its coast lines, as a result of which the inland progress of the early English colonists, and of the later immigrants from many countries, carried them westward across North America within the limits of a single climatic belt, instead of northward across many. The belt thus naturally marked out includes the greatest area of the best land on the continent. The early boundaries of the belt lay near the St. Lawrence on the north, where the French had planted colonies, and near the Gulf of Mexico on the south, where Florida was colonised by the Spaniards. From these beginnings a great expansion was accomplished in the century of independence; and the new territory, at first in charge of governors appointed at Washington, was gradually, part by part, brought into the fellowship of States, until at present only New Mexico, Arizona, a remnant of Indian Territory, and the remote Alaskan province are still outstanding.

The Declaration of Independence on the 4th of July, 1776, was the natural result of unjust legislation on the part of the British government imposing burdens upon the colonies without offering equivalent privileges to them, and Great Britain,

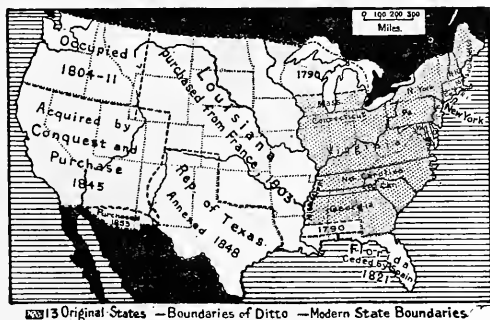


FIG. 350.—The expansion of the United States.

was compelled to recognise the independence of the colonies in 1783. Florida was bought from Spain in 1819, Louisiana (the western half of the Mississippi basin) was bought from France in 1803, Oregon was acquired by right of exploration, the south-west from Texas to California was gained from Mexico between 1845 and 1853, after a manner which the Americans had aptly inherited from their ancestors in Europe, and Alaska was bought from Russia in 1867. Finally, Hawaii was annexed, the Philippine Islands and Porto Rico were ceded by Spain, and the protection of Tutuila in Samoa was assumed in 1899.

The States and the United States.—Since the formation of the Union, and particularly since its cementation after the Civil War of 1861-65, the geographer may turn his attention from the single States to the United States, and this is now done even in the descriptive pages of school geographies, the best of which divide the United States into physical districts, and refer to the separate States chiefly as a means of giving location to the physical features and their industrial consequences.

The individual State is still a unit for the politician and the lawyer, but it is a fraction for the geographer, and very often an improper fraction. The Ohio and Mississippi rivers are exceptional in serving as natural boundaries for many States; but even the great Mississippi does not divide States at its head or at its mouth. The Appalachian mountain-system is most irregularly partitioned among the older States. The western States are generally bounded by lines dependent on the form and rotation of the globe, after a method that has become habitual when civilised man wishes to divide thinly settled and unsurveyed territory. The strong front range of the Rocky Mountains, rising abruptly from the plains, forms no State boundary, but is crossed by the borders of Montana, Wyoming, Colorado, and New Mexico. Commerce is free to cross State limits, while the principle of protection regulates the trade of other nations with the United States as a whole. Many manufacturing and mining companies are incorporated in one State where local laws give them some advantage, carry on their business in another State, and perhaps have their financial office in a third. Railroads truly must have charters from every State that they cross; but this is merely a legal technicality, of no consequence to the passengers or the freight that are carried over the tracks. Several lines of transatlantic steamers, nominally bound for New York City, land their passengers in New Jersey; and but for the accident of a State boundary that runs through New York harbour, Jersey City would have probably been included in the Greater New York, recently formed by consolidating several cities with the metropolis. State capitals are often of less importance than the commercial cities, whose growth follows physical controls. Many business men in border cities reside in the adjoining State, and cross the boundary to and from their work every day: Philadelphia has suburbs across the Delaware in New Jersey; St. Louis across the Mississippi in Illinois; and Kansas City itself spreads across the line between Missouri and Kansas.

Government.—The republican form of government adopted by the

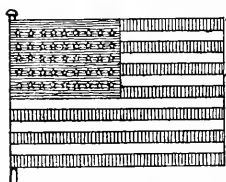


FIG. 351.—*The Flag of the United States—the Stripes representing the 13 original States, and the Stars the present number.*

United States is in many ways paralleled by the governments of the individual States. There is a national constitution, under which each State has its individual constitution. The Union, like the separate States, has the three usual divisions of governmental functions—legislative, executive, and judicial. The President of the whole country has his Cabinet of the heads of departments; the Governor of a State has similar councillors. A Supreme Court sits at Washington, and district federal courts sit in different parts of the country

to act upon questions in which the interests of citizens of more than one State are involved. Each State has a similar judiciary for the decision of local matters. The Congress of the United States consists of the Senate

and the House of Representatives; the Legislatures of the States are similarly divided. The national Senate includes two members from each State—not a satisfactory method of representation to-day, since Nevada (whose population is decreasing), Rhode Island, and Delaware are placed on an equality with New York, Pennsylvania, and Illinois. The representatives are chosen on the basis of population. The laws passed by Congress are uniform for the whole country. Within limits thus defined, the several States frame laws for themselves, often of great diversity in different parts of the country. Many laws regarding slavery formerly obtained in the southern States; liquor laws, restricting or prohibiting the sale of intoxicating liquors, have been passed in several northern States. The right to vote has been extended to women in some of the western States, where conservative traditions have less hold than in the east. With the desire to increase their population, other States have been over-liberal regarding divorce laws; and the desert State of Nevada has even gone to the offensive extreme of permitting prize fights, as if in the vain hope of staying its recent loss of numbers.

People.—The remoteness of the United States from formidable neighbours has fortunately not required the withdrawal of many persons from industrial pursuits into the army and navy; and as long as the territory under the national government remains compact it is probable that the burden of an elaborate, expensive, and unproductive military and naval establishment may be avoided. There is little need for forts and soldiers within the country itself. It is true that individual differences have been too often settled by violence rather than by appeal to the courts; but when the rapidity of settlement and the heterogeneous nature of the population are considered, and when it is remembered that even during the century of independence a large part of the population has had personal experience of the rude conditions of frontier life, the prevalence of good order becomes the striking feature of the country. This must be ascribed chiefly to the plentiful and profitable occupation that the vast extent of new land gave to all comers during nearly all the century of independence; for even with a decennial increase of from five to ten millions there has been land enough and to spare. Another beneficent effect of plentiful occupation has been the rapid assimilation of immigrants, whereby the foreigners from many lands have soon been Americanised. A failure of this process is seen to a greater or less degree in large cities, in certain mining regions, and in some parts of the north-west where the settlement of immigrants, derived largely from a single European country, causes the retention of at least a foreign language if not of other customs foreign to the United States. But in spite of these deficiencies, the leading fact remains that, as a whole, the great population has become naturalised to its new continental home with a success that recalls the spread of thistles in Argentina and rabbits in Australia; and although uncomplimentary, the comparison is based on sound biological principles.

Religious freedom and public education have contributed largely to the good results which plentiful and profitable occupation have chiefly controlled. There is no established church, and the several larger religious bodies are so strong that no one is likely to overpower the others. Illiteracy is rare, except among the negroes and poor whites of the south. Besides the public schools, for which provision is made with constantly increasing liberality; there are State colleges in most of the States, and there are only too many sectarian colleges, especially in the north and east of the plains, established as if for the religious safety of the young of the several denominations. Large gifts have been made to educational institutions by wealthy men; and the strongest universities of the country, Harvard, Yale, Columbia, Princeton, Pennsylvania, Johns Hopkins, Chicago, and Stanford, have thus been supported in great part. Public libraries are numerous; they are frequently the gifts of successful men to the homes of their boyhood. The establishment of scientific Government Bureaus has greatly contributed to the development of the national

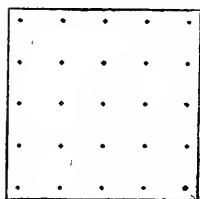


FIG. 352.—Average population of a square mile of the United States.

resources. Notable among these is the Geological Survey, now engaged in mapping the entire national domain; and the liberal method of disposing of its publications at a nominal price, in order that they shall be widely used, deserves imitation elsewhere. The Weather Bureau of the United States is unique in the area covered, and in the promptness of publication of its daily maps.

With the aid of education, and the incentive of industrial opportunity, the people of the northern States have been remarkably fertile in mechanical inventions, to say nothing of the application of perverted ingenuity to the development of "rings" in politics and "corners" in the markets, and of monopolies and over-profitable trusts in corporations.

Towards the close of the nineteenth century certain unfavourable reactions followed the rapid growth in population and wealth. Immigrants of a less desirable class than the early comers have made their appearance in increasing numbers, chiefly from eastern and southern Europe. Many of them remain in crowded seaports instead of entering further into the country. Disputes between incorporated employers and the employed have become more and more serious in their nature. The multiplication of factories and the competition among manufacturers compels such economy in production as to reduce wages, and for this reason more than any other, new markets for manufactured products are now eagerly looked for. If the twentieth century witnesses a territorial expansion beyond the present boundaries, the change will be made largely on commercial grounds; for with nearly all the valuable public lands now disposed of to incorporated or to individual owners, and with a rapidly increasing excess of production over consumption, the demand for new

opportunities on the part of the "business men" may prove stronger than the resistance of those conservatives who feel that a republic of wide-spread territory is not compatible with the Declaration of Independence and the principles of the Constitution. That such a result should have already come within the range of possibility only emphasises the marvellous changes of the United States during the century of independence.

Trade.—The foreign trade of the United States is mainly carried on by the seaports of New York (through which almost one-half of the trade of the country passes), Boston (which comes next with only one-tenth), New Orleans, Baltimore, Philadelphia, and San Francisco. It is carried on mainly under foreign flags, only one-ninth of the value of the export and import trade being done in vessels belonging to the United States. On the other hand, no foreign vessels are allowed to engage in coasting trade from one port of the United States to another. The value of the exports considerably exceeds that of the imports. The former consist mainly of agricultural produce—wheat, animals, preserved meat, &c., from the prairie States, and raw cotton from the south Atlantic and the Gulf coastal plains; these together make up two-thirds of the exports. Manufactures are exported nearly to the value of one-third, most of the products of mines and forests being required for home use. The imports are mainly of products which cannot be produced in the United States, or not in sufficient quantity for the demand, such as coffee, sugar (the largest import, amounting to one-seventh of the value of the whole), raw wool and silk, and certain manufactured goods. The import of such articles as can be manufactured in the United States is discouraged by the imposition of a heavy tariff, which raises the price to the consumer, and so benefits the manufacturing class with less advantage to the farmers. Nearly half of the exports go to the United Kingdom; Germany comes next in importance as a customer, and Canada, France, and Holland follow. The United Kingdom sends one-fifth of the total imports, Germany and France come next with one-fifth between them. The imports are drawn from a wider field than that over which the exports are distributed; thus, while at least 76 per cent. of the exports are sent to Europe, only 55 per cent. of the imports are drawn from that continent. The recent development of the total trade is shown in Fig. 71.

II.—REGIONAL GEOGRAPHY

THE APPALACHIAN BELT

The Appalachian Belt.—The chief geographical features of the eastern United States cannot be appreciated until it is understood that a great part of the region has been uplifted by tectonic forces, worn down to a nearly level surface by erosion, and after being again more or less uplifted is now once more in process of dissection. The Appalachian

Mountains were first formed by disturbances so long ago that once at least in later times the mountains have been worn down to an extensive lowland of moderate relief, close to the level of the sea ; and the mountains of to-day are either the occasional unconsumed remnants of the lost ranges, or the product of renewed uplift and dissection. Thus viewed, the Appalachian belt may be easily subdivided and described ; thus described, a close connection will be found between its geological history and its present form ; and again, between its present form and its control over human conditions.

Divisions of the Appalachian Belt.—An eastern division of the Appalachian belt consists of ancient crystalline rocks, such as schists and gneisses, with many areas of granites and other igneous intrusions. A western division consists of a great series of Palæozoic strata, chiefly derived from the waste of the older rocks on the east, and now greatly tilted and folded. Both of these divisions were well worn down to lowlands over the greater part of their area during Mesozoic time ; but the hardest parts of the crystalline division survived in residual mountains, for which the generic name *monadnock* is coming into use, after a fine residual mountain of this name in south-western New Hampshire. The White Mountains of New Hampshire and the Black Mountains and other ranges in North Carolina seem to be groups of such monadnocks.

If viewed in Cretaceous times, the Appalachian region would have been seen as a broad, gently rolling lowland, here and there surmounted by monadnocks, singly or in groups. Since then the lowland has been raised into an upland, bearing the monadnocks on its back. The quiet streams of the lowland were thus revived into new vigour, and new valleys have consequently been incised beneath the upland surface. Unlike the earlier mountain-making disturbances, the later uplift was of a gentle nature, producing a broad swell, whose arch-line follows the Appalachian trend, and whose side slopes fall off slowly to the south-east and north-west. Much of the Appalachian system is therefore not mountainous to-day ; near the sea it may even include extensive areas of low land. The broadly uplifted portion has regained the appearance of mountains chiefly by the excavation of valleys along the belts of weak rocks, or along the paths of its larger streams. The mountains and ridges of to-day must therefore be regarded as forms of circumdenudation, like those of the Scottish Highlands, in contrast to mountains of direct uplift, such as occur in certain parts of the western United States.

Following principles of wide application, it may be briefly stated that the valleys worn by the larger streams in the uplifted lowland are now deep where the lowland was raised highest, and shallow where the least uplift occurred. Again, the valleys are broad where the rocks are relatively weak ; here, indeed, lowlands of a later generation have been developed, above which the local belts of harder rocks stand as residual hills and ridges of the second order. Where the rocks are resistant the

valleys are still narrow, time enough not yet having elapsed since the uplift to permit the valleys to grow wide. The varied combinations of these controlling factors give rational explanations to a great variety of geographical forms.

The Older Appalachian Belt.—The eastern or crystalline division of the Appalachians—the Older Appalachian Belt, as it may be called (OA in Fig. 353)—consists so largely of resistant rocks that its uplands preserve the altitude given to them by uplift over large areas, and the valleys worn out by the streams are relatively narrow. The western or stratified division—the Newer Appalachian Belt (NA in Fig. 353)—includes a much larger proportion of easily weathered rocks; hence its valleys are well worn down, and its narrow ridges occur only where the harder strata are found. The even crest lines of the ridges, a striking feature of the Newer Appalachians in Pennsylvania, Virginia, and Tennessee, are analogous to the even uplands of the Older Appalachians. The breadth of the older and newer belts is very variable. The older belt is narrow and low between New York and Washington, and broad and high in New England and North Carolina. The newer belt is represented chiefly by a broad valley north of Albany; it is still broader, with many ridges and valleys in Pennsylvania and Virginia.

After thus recognising the division of the Appalachians into two chief longitudinal belts, there are certain contrasts between the northern and southern part of the system that deserve attention. North of New York City, a comparatively recent depression of the Appalachian region, increasing towards Newfoundland, has drowned the borders of this geographical province beneath the waters of the Atlantic, bringing the sea against the resistant rocks of the once deep-seated mountain structures. South of New York, an elevation of the region, increasing towards Alabama, has revealed the unconsolidated deposits of a former sea bottom in the coastal plain of the southern States. Few simpler examples of the manner in which crustal movements determine geographical forms can be found than this, and few in which the arrangement of geographical forms has a more direct influence on the conditions of human life.

The Atlantic Shore Line.—The shore line of the northern Appalachians is extremely irregular; many long arms of the sea enter between low rocky headlands and outlying islands; comparatively deep water is carried into the re-entrants of the coast, making numerous and excellent harbours; but the rugged hill country follows almost immediately inland, discouraging agriculture. Mount Washington, the highest of the White Mountains, and many other monadnocks are in sight from the sea.

The shore line of the southern coastal plain is usually fringed with sand reefs, broken by tidal inlets and enclosing shallow lagoons. The sea is shallow, deepening very gradually towards the outer edge of the continental shelf, where the rapid descent to the true ocean basin begins, a hundred miles or more from shore. The land is very flat, ascending slowly

inland ; no hills surmount its surface. It is traversed by rivers whose courses have been extended forward from the former shore line at the inner border of the coastal plain, but the river valleys are eroded only to a very moderate depth ; not until the inner border of the plain is approached is the surface so well dissected as to be called hilly. Agriculture is promoted on the more fertile parts of the plain, and upon the deep soils of the smooth uplands of the Older Appalachian Belt, next inland. When it is remembered that the rugged surface of New England was settled by religious refugees, whose convictions were as rugged as the country they peopled, and that the southern States were settled by colonists whose motives were generally commercial rather than religious, a long sequence of historical consequences may be traced from the association of unlike people on unlike lands.

The movements of the land whereby the configuration of the shore line has been effected must be pursued one step further. A slight depression has followed the elevation of the coastal plain from New Jersey to North Carolina ; thus the broadened valley floors of the chief rivers have been submerged, forming bays and estuaries, from that of the Delaware to that of Pamlico Sound. On the other hand, a recent movement of elevation has partly counteracted the previous movement of depression in New England, for the littoral districts of Maine and New Hampshire contain smooth plains of marine clays that interlock with the rocky arms of the land.

The order of settlement, the arrangement of State boundaries and the occupation of inhabitants in this region had been profoundly affected by the physical features, thus briefly sketched. The early colonists in tide-water Virginia found protected harbourage in the many branching bays of the Chesapeake and lower Potomac ; for many years communication between them was more easily carried on by water than overland through the forests. Although the drowning of these former valley lowlands has been a loss to agriculture, there is some compensation for the loss in the valuable fishing grounds which they afford. Their importance in determining political units is manifest. The largest bays of the coastal plain divided the colonies of Virginia and Maryland. Another bay led to the establishment of Pennsylvania and Delaware, leaving New Jersey on its eastern side. The south-pointing peninsular areas defined by the bays determined the small area of the three colonies that occupied them, in contrast to Virginia and Pennsylvania, which at the time of the Revolution, claimed all the land westward to the Pacific.

The Atlantic Coastal Plain.—Various features of the coastal plain, constantly reflected in the distribution and occupation of the people, may well serve as types for this class of land forms. The outer border of the plain, fronted by shallow water and fringed with sand reefs from New Jersey to North Carolina, attracts no commercial settlements, but is increasingly frequented as a holiday resort : *Atlantic City* on an off-shore reef in southern New Jersey is the largest town of this kind (Fig. 354). Along



FIG. 353.—Physical Divisions of the United States.

the North Carolina shores, the sand reefs, locally known as "banks," have a peculiar concave outline to the sea, meeting in sharp points or cusps, forming Capes Hatteras, Fear, and Look-out. These are believed to be due to the interaction of several large back-set eddies of the long-shore waters, which seem to turn in local circuits between the Gulf Stream and the continent. The cusps are the most perfect examples of such shore forms anywhere known. The "banks" are occupied by small communities of isolated people, known as "bankers." A small breed of horses, known as "banker ponies," here run wild, subsisting on the coarse grass that grows on the sandy soil; in the absence of brooks, the ponies find fresh water by pawing away the sand in the depressions between the dunes.

The islands along the coast of South Carolina are peculiar in being interrupted by numerous tidal inlets, a direct result of the increased strength of the tides in the "Carolina bight" of the Atlantic coast. Here the off-shore islands are not entirely composed of sand reefs, but in part resemble detached portions of the mainland; their soil is rich and produces the famous "Sea Island cotton"; they are exposed to dangerous sea-floods, when on-shore hurricane winds conspire with a rising tide. The tidal waters behind the islands are much reduced in area by the growth of extended marshes, whose inner stretches produce abundant rice crops.

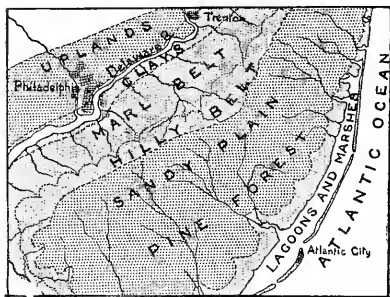


FIG. 354.—Part of the Atlantic Coastal Plain.

The important commercial cities of the coastal plain are generally situated on embayed valleys and estuarine rivers; some are near the coast line, like Norfolk, Va., Wilmington, N.C., Charleston, S.C., and Savannah, Ga.; others are at the inner border of the plain like Trenton, N.J., Philadelphia, Pa., Baltimore, Md., Washington, D.C., and Richmond, Va., these cities being at or near the head of tide water. Others, like Raleigh, N.C., and Columbia, S.C., are at the "falls" of their respective rivers, above the reach of tide, but at the head of river navigation; the "falls" being formed where the streams, coming forward from the interior, pass from the resistant rocks of the older land to the unconsolidated strata of the coastal plain. If an observant traveller should traverse the coastal plain along any of the transverse inter-stream strips or "doabs," into which it is divided by the chief rivers, he would find that its soil, the surface expression of its loose textured strata, is arranged in belts that trend nearly parallel to the Atlantic shore line; cleared and farmed where marly or limey, barren and left to pine forests where sandy; the forest, however, yielding large quantities of lumber and resinous products in the southern States. Southern Virginia

and North Carolina include extensive fruit and vegetable farms on the smoother parts of the coastal plain, from which the markets of the northern cities are now largely supplied. Part of the plain near the shore is so low and flat that the growth of vegetation builds up its surface, forming extensive swamps, of which Dismal Swamp, on the borders of Virginia and North Carolina is the largest example. Unlike many other swamps, these occupy the highest ground in their district, and streams run out of them, not into them; where drained and cleared they have been transformed into good farming land.

On passing inland, an increasing diversity of relief is found; the low flat plain near the shore is gradually replaced by a surface in which the valley slopes of the intrenched streams have the appearance of hills; but if our language would permit it, this district should be called a valley rather than a hilly country. The more resistant layers of the plain, generally half cemented sand-stones, sometimes come to surmount the less resistant and more denuded layers further inland, giving a belt-like arrangement in form as well as in soils. Thus a low upland encloses an inner lowland from Newark to Camden, N.J., important as a natural pathway between the chief Atlantic cities and characterised by many pits and potteries on its clayey substratum. Artesian water supply is a marked feature of the outer part of the coastal plain, where its importance increases with the growth of the population, and with the better understanding of the menace to public health in shallow surface wells and polluted streams. The larger shore resorts on the sand reefs are supplied in this way as well as the mainland. Certain towns in peninsular Maryland sink their artesian wells into water-bearing strata or "aquifers," that reach the surface and gather their rainfall west of Chesapeake Bay.

People of the Coastal Plain.—As the southern colonies grew on the coastal plain and the people pressed inland, they found an open country, easily occupied as far as the residual mountains of the Blue Ridge and its fellows in Virginia and North Carolina; but these and the Allegheny Plateau were long-enduring obstacles to the settlement of the further interior. In North Carolina particularly, where the old Appalachians are broadest and most mountainous, movement from east to west was almost forbidden; and to this day an unusually large share of the descendants of the early colonists remain on the coastal plain, on the piedmont slopes, or among the valleys of the inner mountains, with comparatively little gain by immigration from Europe. Nowhere else in the United States is so large a part of the population "native born" and "born of native born." Local habits of speech and home-spun clothing are no rarities in villages among the mountains, which form a fitting geographical environment for conservative ways of life.

New England.—On the New England coast, examples of geographical controls are no less distinct than further south. Here the distinction between upland and lowland depends chiefly on the distribution of strong

and weak rock structures in the Older Appalachian Belt. The strong structures still preserve something of the upland surface gained by the uplift of the worn-down old Appalachians ; they are low only near the coast, where they were little uplifted. The weak structures are already worn down to lowlands again. In the present depressed attitude of the region, the stronger structures stand forward in headlands on the coast line, like that of Cape Ann, Mass. *Gloucester*, on a good harbour on this headland, sends out a large fleet of fishing vessels to the Newfoundland Banks : the headland granites are quarried at *Rockport*, and sent away in heavy-laden schooners to more southern ports. The valleys and lowlands are more or less drowned, forming embayments like Boston Harbour ; and *Boston* has outstripped the neighbouring settlements of Plymouth and Salem, its rivals in early

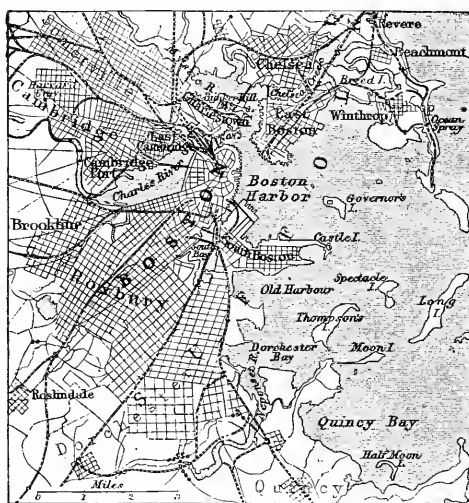


FIG. 355.—The Site of Boston, Mass.

times, in great part because it stands further inland, and therefore in better connection with the interior population of later growth. In New England many of the towns borrowed names from the mother country ; but the chief colony took the name of a monadnock a few miles south of Boston, and now reserved as a metropolitan park, and known to the Indians in colonial days as "Massachusetts" or Great Hills, the first land to rise over the sea horizon on approaching Boston from the east.

The rugged uplands, gradually gaining height inland, were slowly settled, and still offer only hard conditions to their occupants, however well the villages and cities in the valleys may thrive. After a trial of the higher uplands as dwelling places in the eighteenth century, many families moved out west to the prairies in the nineteenth century ; towards the close of the latter period, the "hill towns" of western Massachusetts exhibit a very general decrease of population. Here the Old Appalachian Belt is so broad that no river crosses it. Its gain of height (apart from the scattered or grouped monadnocks that rise above it) is so well maintained northward and westward, until reaching a sudden descent from its culmination into the Appalachian valley, that the crest line naturally suggested colonial and international boundaries ; thus New York, led inland northward by the Hudson valley, acquired the land west of the Taconic and Green Mountains ;

and Canada on the north would have been limited by the divide between the Atlantic waters of Maine and the branches of the St. Lawrence, had not such a boundary lain further north than was expected. Here in the north, the barrier of the Older Appalachian Belt, broad and rugged like that which separated the Carolina colonies from the interior wilderness, divided New England and its Puritan stock from Canada and its French population.

It was to a lowland, etched out beneath the general level of the upland and then partially submerged in Narragansett Bay that Roger Williams and his independent followers removed from the Massachusetts Colony; thus the city of *Providence* and the little Colony of Rhode Island were founded. *Newport*, on an island at the entrance to Narragansett Bay, has become a popular seaside resort on account of its agreeable climate. Parties of settlers around Boston finding themselves crowded, and like an overstocked hive of bees, as a contemporary writer said, ready to swarm, crossed the hilly uplands in 1637, and entered the Connecticut valley lowland, a broad depression worn down on a belt of comparatively weak Triassic sandstones. Some of the towns thus founded remained members of their parent colony; others asked for a new charter, and thus the small colony of Connecticut was formed; it is crowded, like Rhode Island, between its larger neighbours. Its chief cities, *Hartford* and *New Haven*, lie in the lowland that attracted its early settlers.

Further north the uplands are so extensive, the monadnocks are so numerous, and the valleys are often so deep-cut, that the population has grown slowly. Northern Maine is still a forested wilderness; outlying settlements there are to this day called "plantations," in the sense of the word used by the early colonists, and not with the acquired meaning of "an extensive farm," usual in the southern States. Remnants of Indian tribes still remain here. Only the southern part of Maine is well peopled; *Portland* having a fine harbour on the coast; *Augusta*, the capital, and *Bangor*, a great lumber market, being situated at the head of tide on the estuarine waters of the Penobscot and Kennebec rivers. The coastal border is here almost too much dissected by the drowning of its valleys and lowlands; for its village communities are thus isolated to disadvantage on islands and long slender land-arms; local travel in small boats is not always easy on account of the tides, whose strong rise and fall often make landing troublesome, and whose rapid currents frequently overcome oars and sails. In the last thirty years a large "summer population" has resorted to these islands, where the cool water gives the air a mild temperature. Mount Desert, already mentioned, containing a number of summits over a thousand feet in height, the boldest land on the eastern coast of the United States, is the most famous of these summer settlements.

New Hampshire has the advantage of a good harbour at *Portsmouth*, and of a fine river in the Merrimack; but its uplands are thinly peopled, and its mountains are visited only by lumbermen and vacation tourists. Deforestation is already giving cause for alarm here and in Maine, especially

since even the smaller trees are taken to feed the pulp mills, called into being by the many pages of the modern newspaper. The State of Vermont has no seaport and an over-large share of rugged highland. Its industries are rural rather than manufacturing or commercial ; its population is increasing slowly.

In all the New England States building stone is an important product. Granite and similar crystalline rocks are quarried extensively, many quarries having the advantage of a situation on or near a navigable tide water. Marble and slate are found in the Green Mountain valleys. Sandstone is taken in large quantities from the Connecticut valley for use in ornamental architecture.

Glacial Action in New England.—The imprint of glacial action is strong in New England. The deep soils of the southern States, gradually passing into firm rock at depths of from thirty to fifty feet, are here replaced by an immediate change from the surface drift, of very variable thickness, to the glaciated surface of firm, unweathered rock. Many ledges on the upland hills have been left almost bare of soil ; a thin deposit of drift in the crevices, slightly increased by post-glacial weathering, suffices only to support tree growth. Elsewhere the uplands are blanketed over with unstratified drift or till, a compact deposit of rock scrapings from further north accumulated under the slowly moving ice sheet where more waste was brought than could be carried further forward. The till frequently assumes the form of rounded, oval hills, known as drumlins, half a mile or more long, and from 100 to 300 feet high. These are sometimes so plentifully covered with boulders that they hardly serve even for pastures ; but more generally they are cleared and farmed. In certain districts drumlins are so plentiful as to give their pleasing expression to the landscape : southern New Hampshire, and eastern and central Massachusetts contain them in great numbers ; the islands of Boston Harbour (Fig. 355) are nearly all drumlins, cliffed by the waves and furnishing drift for the construction of extensive beaches.

In the valleys and on the lower ground near the coast, various forms of washed drift generally bury the ledges out of sight. Extensive terraces occupy the larger valleys ; their higher levels are rather too sandy for the best farming land ; their lower levels, flooded by the rivers, offer attractive meadows of which none is more beautiful than that of Deerfield, on a branch of the mid-Connecticut, the scene of early settlement and of disastrous struggles with the Indians. It is chiefly in connection with the irregular distribution of the valley drift that the numerous small lakes of New England are to be explained. Their basins were first accounted for by glacial erosion, but at present it is more generally believed that they mark the sites of lingering remnants of the melting ice sheet, while the evacuated space about them was filled with sands and gravels. The lakes form natural reservoirs for the water supply of the villages and cities ; the water being pure except in autumn, when, the temperature being

uniform from surface to bottom, overturnings are easily caused by the winds, and the impurities gathered in the deep water during the summer are discharged. Ice from the lakes is an important winter harvest ; and at one time Wenham ice, from a small lake near Salem, was famous even in India.

Water Power in New England.—The rivers, entrenching their courses in drift-clogged valleys have repeatedly lost their former channels and cut down upon rocky ledges ; thus dividing their courses into smooth-flowing reaches and hurried rapids and falls. The latter supply the great water power of New England, on which its vast manufacturing industries began. *Fall River*, on an eastern branch of Narragansett Bay, was at first satisfied with the power derived from a small stream ; now its myriad spindles are driven by steam. The mills here and in *New Bedford*, a little further east, profit from the high humidity of the atmosphere near the sea, an important factor in spinning cotton. The sites of *Lowell*, *Lawrence* and *Manchester* were occupied by farms seventy years ago. Enterprising capitalists and engineers took control of the great water powers of the Merrimack, and to-day the river, supplemented by steam in dry seasons, drives more cotton mill spindles than any other river in the world. Thousands of French Canadians now make their homes in these factory cities, working as operatives in the mills.

In Maine the falls of the Saco gives rise to the paired cities of *Saco* and *Biddeford* ; those of the Androscoggin determine the sites of *Lewiston* and *Auburn*. It is noticeable that these manufacturing towns in Maine are near its south-western corner ; numerous water-powers in other parts of the State are too remote from the chief markets of the United States to be utilised to their full value at present. In Connecticut, on the other hand, near the great commercial centre of New York City, hardly a single waterfall is idle. Here a certain feature of water-powers of indirect glacial origin deserves notice. In the normal river, the trunk stream has, as a rule, graded its course so as to secure a steady flow ; it may even be navigable. Rapids and falls are found only on the upper waters, where the smaller branches, working in districts of greater altitude and frequently on rocks of greater resistance, have not yet been able to wear down their channels to an even slope. Although falls are here abundant, the volume of water is deficient, and the prevailing ruggedness of the head-water hills is disadvantageous to large settlements. But the falls on rivers of drift-terraced valleys are placed at haphazard, as well on the lower trunk stream as near the head, and the glacial period is so recent that even the trunk rivers have not yet extinguished their falls. Manufacturing cities situated at falls near the river mouths have the great advantage of large water volume and of neighbourhood to the sea in a low and comparatively open country ; repeated illustrations of the benefits of these favouring circumstances might be named. The lakes are also of practical value as natural reservoirs by which the volume of the lower stream is rendered relatively

constant. Many lakes are dammed at their outlets, and in a dry season the volume of the failing river is maintained by opening the flood gates. In the absence of important agricultural resources, New England has turned so largely to manufacturing that even its abundant water powers do not suffice for its needs. With little or no water power, *Worcester* and *Providence* produce machines and tools. *Lynn* and *Brockton* are "shoe towns." *Waterbury* makes brass ware and clocks, and *Danbury* makes hats. The goods from these active centres find a market, though with increasing competition, in all parts of the country.

Cape Cod and the Outlying Islands.—The most extensive moraines of the New England region are those that mark some of the furthest advances of the ice sheet on the southern coast and on the outlying islands of Long Island, Martha's Vineyard, and Nantucket. A foundation of Cretaceous and Tertiary strata, similar to those of the coastal plain of New Jersey and beyond, but much deformed and denuded before the last ice advance, constitutes the preglacial structures from Long Island to Cape Cod. Belts of morainic hills with numerous boulders increase the relief by a hundred feet or more, giving a pleasing undulation to the surface. Broad plains of washed gravels extend southward from the moraines to the sea, now more or less cut back in the cliffs, as on the east side or "back" of Cape Cod; or fronted with long sand reefs, as along the southern border of Long Island (Fig. 356). In the eighteenth century, when the traveller from Boston to New York went more comfortably by sailing packet than by land, even the outermost island of Nantucket was not the out-of-the-way place that it is to-day; and for some time after overland travel was established a thrifty Quaker stock and an active whaling industry made the island prosperous; but when whales became scarce and when rock-oil replaced whale-oil, the trade and population of *Nantucket* dwindled, its wharves decayed, some of its houses were carried away to the mainland, and it was almost in danger of being deserted, until in recent years when its value as a quiet summer resort was recognised. *Provincetown*, a land's end village on Cape Cod, is peculiar in containing a colony of Portuguese, the families of fishermen and sailors. Here on a great wave-built spit, covered with sand dunes, the Pilgrims first landed; but seeing the morainic hills of Manomet across Cape Cod Bay, they sailed on and founded Plymouth, where the famous rock on its shore is only a glacier boulder of modest size, too small to be chipped off for keepsakes by the many descendants of the Pilgrims.

Gateways to the Interior.—The narrowing of the Older Appalachian belt between New York City and Washington, due to ancient subsidence of a part of the ranges, has been of great importance in determining points of entrance of immigration towards the vast Mississippi basin; for nearly all the many thousand emigrants from Europe have reached the interior by gateways through this least formidable part of the mountains. There can be little doubt that the important commercial cities of New York,

Philadelphia, and Baltimore owe their growth to the easier access thus allowed to the interior of the country behind them. Ports like Providence, Boston, Salem and Portland, further north, and ports like Norfolk, Wilmington, Charleston and Savannah, further south, chiefly serve local needs; they cannot compete in international traffic with the three intermediate cities, of which Boston and Norfolk are the only important rivals. The pre-eminence of New York among the middle ports is dependent partly on its good harbour, partly on being nearer Europe than the ports further south, and much more on the navigable waters of the Hudson that reach inland almost across the Appalachian Belt.

The Newer Appalachian Belt.—The last point may be better appreciated after a fuller account of the Newer Appalachian Belt (N A in Fig. 353), whose inter-ridge lowlands are worn down on the weaker Palæozoic strata. They extend from the Gulf of St. Lawrence (beyond the territory of the United States) along a curved path past New York to Alabama, and there disappear under the overlapping strata of the Gulf coastal plain. In the north the newer belt is limited on the inland side by the Laurentian plateau of Canada, and by an outlying area of similar structure and more rugged form, known as the Adirondack Mountains, in northern New York. From Albany to Alabama, the inland boundary of the ridge-and-valley belt is formed by the escarpment of the Allegheny plateau. In New York the ridges are few and the lowland is broad and open, but from New Jersey to Alabama, long, narrow, even-crested mountains of curious zigzag pattern, 1,000 to 3,000 feet high, formed on the outcropping edges of resistant sandstone layers, are very numerous. They divide the lowlands into many compartments, with difficulty connected by roads over the mountains, but open to one another where rivers have cut transverse notches or water gaps. The ridges are highest in Virginia, where some of the crests rise to 4,000 feet; and here most of the valleys between them are so narrow and deep as to be of small value for settlement. Much of the better timber has been cut from the ridges, but they are still left to forest growth, for their slopes are cloaked with coarse, slow-creeping blocks of sandstone, the waste of the ridge-making strata.

The valley floors between the ridges are sometimes underlain by limestone, especially along the eastern border of the Newer Appalachian Belt; here the rich soils are occupied by some of the best farms in the country, albeit they have not the unlimited expanse of those on the western prairie. *Harrisburg*, the capital of Pennsylvania is in the midst of these thrifty surroundings. Beds of anthracite coal and plentiful deposits of iron ores among the ridges of Pennsylvania have contributed greatly to the wealth of the Keystone State—so called from being the middle one of the thirteen colonies in the time of the Revolution. Mining industries have here attracted colonies of European labourers, where foreign languages are often more prevalent than English. The iron ores of the southern part of the belt, near the coal-fields of the plateau on the west, have been an

important factor in the development of the "New South" since the Civil War ; the centre of the iron industry in Alabama having ambitiously taken the name of *Birmingham*.

The continuity of lowland along the eastern side of the Newer Appalachian Belt has given this part of its floor the general name of the Great Appalachian Valley ; it is locally known as the Hudson Valley in New York, the Kittatinny Valley in New Jersey, the Cumberland Valley in southern Pennsylvania, the Shenandoah Valley in Virginia, and the Valley of East Tennessee. The Great Valley is peculiar in being drained by a number of independent rivers that find exit through the deep gorges cut in the uplands on the east or west. Exceptions to this rule are seen in the longitudinal escape of the St. Lawrence with its branch from Lake Champlain in the north-east, and of the Coosa in the south-west ; both of these rivers run out lengthwise at the extremities of the valley. The Hudson, Delaware, Schuylkill, Susquehanna, Potomac and James all rise in the valley, or on the plateau to the west of it, and reach the Atlantic through steep-sided, narrow gorges in the uplands of the Older Appalachian Belt. The New-Kanawha and the Tennessee rise in the Older Appalachians of North Carolina, and escape westward through deep gorges in the Allegheny plateau to the Mississippi system and the Gulf. It is interesting to note that the six Atlantic rivers all cross the Old Appalachian Belt in or near its low and narrow middle part ; their valleys serving as so many entrances to the interior, and thus emphasising the contrast already noted between the lower middle and the higher terminal districts of the Atlantic highlands.

Transverse Valleys in the Old Appalachian Belt.—The physical relation between the lengthwise lowlands of the Great Valley and the transverse gorges by which its rivers escape has been generally misunderstood. The broad lowland and the narrow gorges are the work of erosion in the same period of Tertiary time. The rivers had much the same pattern as to-day when all this region had about the altitude of its uplands and ridge crest. Since then the excavation of the broad inner valley and the incision of the narrow gorges have gone on together : indeed, the incision of the gorges on the transverse course of the several rivers in the harder rocks of the Older Appalachian Belt was the essential antecedent to the deepening of their channels in the weaker rocks of the newer belt ; but while the gorges have widened very slowly in the harder rocks, the weaker strata of the inner belt have, as it were, melted away under the weather, and the inner valley has become as broad as the belt of weak strata that guide it. Since the general form thus described was developed, a moderate uplift of the region has again set the rivers at work, and they have cut narrow trenches in the valley floors.

The Hudson and St. Lawrence are unlike all the other rivers of the Great Valley in having their valleys partly flooded by sea water, in consequence of the moderate depression of the northern lands already mentioned in describing the bays of the New England coast. The lower St.

Lawrence is thus broadly expanded into a funnel-shaped bay, misnamed a gulf ; but the drowned Hudson is closely hemmed in by the steep walls of the highlands. It thus retains the appearance of a river, although its volume is by no means an appropriate measure of the rainfall on its basin. It is a deep navigable waterway, open to large vessels to the head of tide at Albany and Troy, 150 miles from New York. It is the only deep-water passage through the Atlantic highlands ; and on this fact chiefly depends the metropolitan rank of New York City among the Atlantic seaports. The northward extension of New York Colony and State, from its first settle-



FIG. 356.—The Site of New York City.

ment at the mouth of the Hudson, repeats the northward extension of Virginia and Pennsylvania from the colonies on their lower bays. Just as the latter colonies claimed possession of long belts of territory westward to the Pacific, and thus confined Maryland, Delaware and New Jersey to small areas, so the former claimed control of all the land west of the northern Older Appalachians, and thus determined the small dimensions of the New England States. Had the Potomac been drowned, not only in its course across the coastal plain as far inland as Washington, but through its gorge in the Blue Ridge to Harper's Ferry, Norfolk might have tried to rival New York City ; yet, even then, the upper Potomac would have had no

branch valley comparable to that of the Mohawk, by which, as will be shown further on, New York City has so greatly benefited.

New York, Philadelphia and Baltimore.—The relation of *New York City* to the interior of the United States has determined its relation to Europe. Commercialism is here supreme. The banker, the broker, the importer, and the railway director are the leaders of business activity. Standing as the chief port of entry for commerce and immigration, the city has gathered colonies of all the peoples of Europe. Germans, French, Italians, and many other nationalities here group themselves together, preserving their foreign ways even to the second generation; much concern is felt by the sociologist over so congested a population. The government of the city is one of the most difficult of political problems, and it has by no means been made easier by the recent consolidation of Brooklyn and other independent municipalities in "Greater New York." The professional politician and the "boss" accomplish their selfish ends by most elaborate and successful management of the people. The narrow island between North (Hudson) and East rivers has become inconveniently crowded; elevated railroads, running to the northern suburbs, make the streets resound with their many trains, although the New Yorkers seem to accept the noise as a proper part of the bustle of their great city. A huge suspension bridge connecting New York and Brooklyn very imperfectly accommodates the crowds that throng it morning and evening.

Philadelphia has been favoured in another manner. It began with the

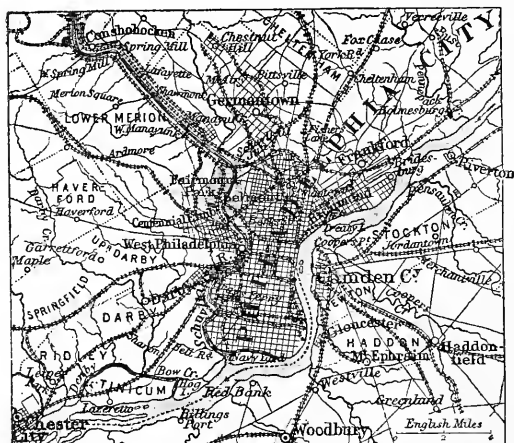


FIG. 357.—The Site of Philadelphia.

thrift of the Quaker followers of William Penn; it has profited from the presence of many industrious German immigrants on the rich farming lands of the Great Valley, near at hand; it has had a commercial advantage in being the southernmost Atlantic port in the non-slaveholding States. Furthermore it has had great physical advantage from abundant open ground on which to expand, so

that the proportion of houses to families is very large; from the water power of the Schuylkill, whereby it has come to be a great manufacturing city; and from the small altitude and width of the Older Appalachian Belt in the background, so that the communication with

the interior of Pennsylvania has been comparatively easy. The uplands are narrow here because of the strong overlap of the coastal plain. They are low, because they have been but little uplifted since they were worn down in Cretaceous times ; but more than this, they happen here to include a tract of weak Triassic sandstones and shales (like those of the Connecticut valley and the Bay of Fundy), which occupies a large part of their small breadth, and indeed obliquely traverses them from east to west. The sandstones and shales are now worn down to a lowland, like the Great Valley next adjoining on the west. Nowhere else are the Older Appalachians so inconspicuous as here. Indeed, if traced by the empirical guide of height instead of by their geological composition and their physical characteristics, they might be overlooked, as has often happened in geographical descriptions. Extensive railroad systems connect Philadelphia with the coal-fields of Pennsylvania, and with the Ohio Valley ; but so great is the importance of New York, that all these roads now continue their trains past Philadelphia to the metropolitan city (see Fig. 336).

Baltimore is practically the civic representative of Maryland. In contrast to Philadelphia, it is the northernmost commercial city of the south. It is physically the result of the far inland reach of Chesapeake Bay, and of the access to the further interior afforded by the valleys of the Potomac and Susquehanna rivers. The bay brings in ocean-going vessels and develops international trade, as well as supporting an active fishing industry ; oysters being included under fisheries on commercial rather than zoological grounds. The Potomac valley leads a great railroad from the harbour city towards the Ohio region ; but the difficulties encountered in crossing the Allegheny Plateau and the comparatively small population on the way, have made this line less successful financially than the chief railroads further north. Educationally, Baltimore has in Johns Hopkins, the southernmost university of wide resort, as Boston has (in its suburb of Cambridge) Harvard, the northernmost great university ; the latter is an outgrowth of an early colonial beginning in 1636.

It is noteworthy that the three great commercial cities just described are not the capitals of their States. The State governments have their seats in Albany on the Hudson, Harrisburg on the Susquehanna, and Annapolis on Chesapeake Bay. *Washington*, whose situation on the lower drowned Potomac corresponds

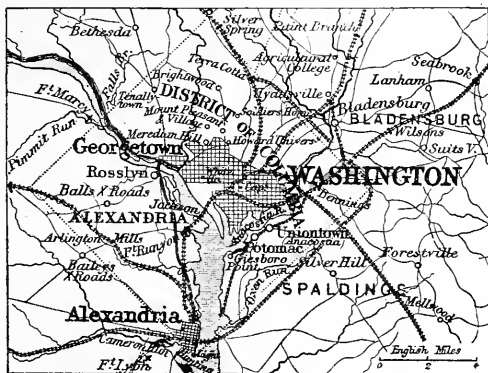


FIG. 358.—Washington and the District of Columbia

to that of Baltimore on Chesapeake Bay, is purely a governmental city. The great water power of the Potomac, where it runs from the Old Appalachian Belt to the Coastal Plain, is not yet utilised for manufactures.

THE ALLEGHENY PLATEAU

The Allegheny Plateau (A P in Fig. 353) is the westernmost division of the Atlantic highlands. It retains much of the forest which originally covered nearly all the region east of the Mississippi and south of the Ohio. Its altitude ranges from 2,000 to 4,000 feet. It extends as far south-west as the mountain belt, and like it disappears under the coastal plain of the Gulf. It is terminated on the east by a strong escarpment, known as Allegheny or Cumberland Mountain in different parts of its front; but on the west or north-west it as a rule decreases in height gradually, and thus merges into the prairie region of the Ohio basin. On the north-east, the plateau is known as the Catskill Mountains, overlooking the Hudson and Mohawk valleys. Throughout this extensive region, the same great series of Palæozoic strata that is broken, tilted, and folded in the mountains of the Newer Appalachian Belt, lies nearly horizontal. Productive coal-beds underlie most of the surface. The well defined north-east and south-west trends that prevail in the uplands, ridges and valleys of the Appalachians, are here exchanged for a systemless maze of digitate spurs dissected by repeatedly branching valleys. The greater part of the region is drained by branches of the Ohio, of which the most interesting is the Kanawha, whose canyon, 1,000 to 1,500 feet deep, is the strongest river valley in the eastern part of the country. The Kanawha is furthermore remarkable in having maintained its course to the Ohio against an arching uplift of the plateau in late geological times, whereby the district traversed by its middle waters was elevated about 1,000 feet more than that about its upper waters; but in spite of this discouragement, the river cut down its channel and held to its former path; thus acquiring a right to membership in the interesting class of antecedent rivers. There is not another river in the whole Appalachian region that so well preserves its ancient course.

The Southern Plateau.—Beginning on the south-west, as it emerges from the southern coastal plain, the features of the Southern Plateau may be called coarse-textured, inasmuch as tablelands that measure several miles across rise between broad-floored valleys. Here the uplands are known as the Cumberland Plateau or Tableland, for the most part a forested wilderness. Although containing great stores of coal, there has been little mining until within recent years, in the return of prosperity to the southern States after the civil war. The plateau is peculiar in falling off on the north-west by an escarpment almost as strong, but much less straight than that by which it is limited on the south-east. The surface thus descends as if by a great step to a platform of less elevation, underlain by limestones; here occur the numerous caverns of Tennessee and Kentucky, of which the Mammoth cave is the most famous. Further to the north-west the platform

is underlain by sandstone, furnishing an infertile soil, and discouraging an impoverished population, in remarkable contrast with the fortunate occupants of the limestone lowlands next beyond, the famous Blue Grass country of Kentucky and the less known but equally fertile Nashville basin of Tennessee (B G and N in Fig. 353). Looking back from the extensive farms of the limestone lowlands, one sees a wooded bluff, several hundred feet in height, known as the Highland Rim. It was from a point on that part of the rim known as Muldraugh's hill that Daniel Boone, late in the eighteenth century, first saw the beautiful lowland that his followers settled, and thus founded what afterwards came to be the State of Kentucky.

The Middle Plateau.—The middle part of the plateau, in eastern Kentucky and West Virginia, reaches altitudes of 3,000 and 4,000 feet, so that its dissected uplands fully deserve the name of mountains, by which they are locally known; and the people appropriately call themselves "mountaineers." As in Tennessee, the region is a great forested wilderness. The separate uplands are seldom broad enough to support more than a small community; often not more than a single family, who find life hard and lonesome. Farming is unprofitable, for most of the surface consists of steep hillside slopes, belted around with contouring sandstone ledges; if the forest were cleared and the ground ploughed, much of the soil would soon be washed away. Roads are rough and steep, badly washed by heavy rains; to keep them in good condition would cost large sums of money, far beyond the means of the county treasuries. The valleys are deep, and their narrow floors are exposed to destructive floods that rise suddenly in wet weather. Bridges are an expensive luxury that only the more important highways can maintain: when streams cannot be forded in time of high water, travel is for a time suspended. The railroad that follows the deep canyon of the Kanawha through the plateau brings the lower lands on the east and west into close connection, but it has little effect on the people among the hills. Even the branch lines that carry out coal and lumber leave the greater part of the plateau country untouched and untamed. The people still live in primitive log houses; hand looms are no rarities; wild game is almost as important a food supply as garden produce; the rifle is as familiar as the spade. Feuds are kept up for years between rival families, and personal differences are settled by an appeal to arms rather than to the courts.

The Northern Plateau.—A less altitude prevails in the plateau within the limits of Pennsylvania, where 2,000 feet will measure most of the upland heights. Here a greater degree of settlement has accompanied the fuller development of the great natural resources of the region, both of these advances being promoted by the neighbourhood of the great manufacturing communities, at first in the north-east, and afterwards in the north-west as well, where a ready market is found for the bituminous coal, the rock oil or petroleum, and the lumber of the plateau. Railroads are nume-

rous and monopolistic corporations dominate the politics of the State. *Pittsburg* has attained an altogether unusual population for a city in the plateau district; it was favoured at first by its situation at the junction of the head branches (Allegheny and Monongahela) of the Ohio, down whose ample current so many early settlers of the western prairies found easy transportation; later by the marvellous development of industries and railroads in the second half of the nineteenth century. It is now one of the greatest manufacturing centres in the United States; the ironworks in and near the city are the admiration of the technical world.

The north-east extremity of the plateau, known as the Catskill Mountains, contains summits as high as those of West Virginia. No mineral products of value, other than too abundant building stone, are found here; hence the mountains remain thinly populated, and are chiefly noted as a summer resort for the crowded population of New York City. Further west, along the southern borders of New York State, the plateau is less elevated, and its rolling uplands and open valleys contain an agricultural population. It happens that this portion of the plateau contains no coal, and comparatively little rock oil; the productive fields being almost entirely south of the Pennsylvania boundary.

Outliers of the Laurentian Highlands.—The rugged Adirondack Mountains of northern New York, and the highlands of northern Wisconsin and Michigan are outlying representatives of the Laurentian highlands of Canada. They consist of extremely ancient rocks, for the most part thoroughly indurated and very resistant. Although their structures are greatly disordered, their relief is of moderate measure; in the Adirondacks, the highest summit, Mount Marcy, is but little more than 5,000 feet above sea-level, with valleys one or two thousand feet deep around it; in northern Wisconsin, the altitude of the highlands is not so great, and their local dissection is much more gentle. Both of these are forested wildernesses, unattractive to the farmer, but tempting to the lumberman. The ancient rocks contain valuable stores of iron ore, less important in the Adirondacks than in upper Michigan, where they are extensively mined and shipped down the Lakes to furnaces near the coal regions. The uplands bordering on Lake Superior are peculiar in containing deposits of native copper, unknown elsewhere in the world. The Adirondacks are separated from the Laurentian region by an ancient trough that has been filled with Palæozoic rock layers and re-excavated in comparatively modern geological times. It is followed by the St. Lawrence river, an important waterway, but so young on its present course that in spite of its great volume, many rapids still interrupt its channel. The Wisconsin-Michigan uplands (O L in Fig. 353), are separated from the Laurentian plateau in Canada by the broad and deep trough of Lake Superior of uncertain origin, but of great value as a member of the vast system of inland waterways by which the wheat of the north-west, the ores of the uplands, and the lumber from the forests are carried to the

more populous States. The outlet of Lake Superior is interrupted by rapids; hence its name, the Sault (pronounced *Soo*) Ste. Marie. These are passed by a canal that has been constructed around them on the southern side (see Fig. 344); the tonnage passing through this canal rivals in quantity, although not in value, that of the Suez canal.

The Adirondack region, and to a less degree the highlands of Wisconsin also, serve as camping and hunting grounds in the summer vacation season, when civilised man seems to enjoy a temporary return to the wilder ways of his remote ancestors.

THE OHIO REGIONS AND PRAIRIES

The Ohio Region.—The region north of the Ohio and east of the Mississippi is one of the most valuable parts of the United States. The surface is of moderate relief, nearly everywhere open to occupation. The soil is rich, the climate encouraging. Into this magnificent territory has poured a tide of immigration during the nineteenth century with which the history of the world has no parallel. The struggles for the acquisition of the land were practically completed before the century opened; struggles in which the stronger invaders repeated too often the harsh treatment that a higher race inflicts upon a lower, but which nevertheless lead forward to progress in the end. The northern Atlantic States, as well as the countries of north-west Europe, furnished hundreds of thousands of able-bodied workers under whose hands the Ohio basin region has grown to marvellous productiveness, activity, and wealth, fully warranting the opinion of Lewis Evans of Philadelphia in 1750, when he urged Great Britain to gain possession of this "great extent of good land in a happy climate," arguing that whatever nation wins it must inevitably gain the balance of power on the continent.

The Ohio Region as an Ancient Coastal Plain.—The physical features of the Ohio region are best explained by regarding it as an ancient coastal plain, skirting the older Laurentian lands of Canada and their outliers in the Adirondacks and the Wisconsin highlands. Travelling southward from the rugged Laurentian highlands of Canada on the meridian of Niagara, a traveller would see the rugged country merge into the fertile lowland of Ontario, partly submerged under the lake of that name; all this low ground being an "inner lowland" worn down on the weak under layers of the ancient coastal plain. Crossing to Niagara, the ascent of a bluff or escarpment of strong limestone, two or three hundred feet in height, makes a distinct break in the general smoothness of the lowland and leads to a broad upland, which then gradually slopes southward to the trough of Lake Erie, a second lowland underlain by weak strata, and in turn enclosed by the hills that form the northern border of the Allegheny plateau. Thus two inner lowlands and two uplands form belts along the border of the Laurentian country; and the rest of the Ohio region may be described in terms of these elementary forms.

The Mohawk Valley.—Following the fading Niagara escarpment eastward beyond its disappearance near Rochester, one sees the two lowlands of Ontario and Erie blend into one, forming the rich farming country of western New York; then narrowing as the Adirondacks come forward from Canada and thus define the Mohawk valley between their southern slope and the escarpment of the Helderbergs, which here forms the north-eastern extremity of the Allegheny plateau. It is the confluence of the Mohawk valley with the navigable tidewater of the Hudson that opened the Great West to the port of New York City. At first an Indian trail, then the path of the frontier settlers driving their waggons up the valley road, next the course of the famous Erie canal whose construction in the first half of the nineteenth century was a fit achievement for the Empire State, now followed by important railroad lines, the Mohawk valley was always a leading line of movement between the east and west. There can be little question that the port that stands in closest connection with its eastern end shall long be pre-eminent on the Atlantic coast. It is true that Philadelphia stands nearer the Ohio region, and that the great railway leading thence to Pittsburg and beyond has the advantage of least distance; but its way leads over the Allegheny plateau where gradients are heavy. It is true that a shorter railway has been constructed from New York to Buffalo than that which follows up the Hudson and the Mohawk; but the shorter line crosses the Allegheny plateau where it is broader than in Pennsylvania, and it has had to pay dearly for its defiance of natural pathways; indeed, had English investors known more of the form of the land when this venturesome road was projected, they would not have become so largely its owners. *Binghampton* and *Elmira* are the only considerable cities on its way among the hills; while the Hudson valley, the Mohawk valley, and the southern border of the Ontario lowland include a much greater population in *Newburgh*, *Poughkeepsie*, *Albany*, *Troy*, *Schenectady*, *Utica*, *Syracuse*, *Auburn* and *Rochester*.

The Great Lakes and the Prairies.—In tracing the Ohio region westward, it is interesting to note the relation of its belted lowlands and uplands to the basins of the Great Lakes and to the path of the international boundary. The northern border belts of the Ohio region are neither straight nor persistent; they vary greatly from the type section on the Niagara meridian. The basins of the Great Lakes exhibit a close relation to the lowland belts. Ontario, Georgian Bay and Green Bay (on the west side of Lake Michigan) occupy depressed parts of the inner lowland; Erie, Huron and Michigan occupy corresponding parts of the second lowland. Between the lakes, the lowlands offer excellent farming districts. The upland of the Niagara limestone, between the two lowland belts, with its bluff looking across the inner lowland towards the rugged old Laurentian land, may be traced with varying strength even beyond the Mississippi; it is of moderate height, and is not rugged enough to discourage settlement. Its course (N on Fig. 353) leads north-west across

the Province of Ontario to the belt of islands that divides Georgian Bay and Lake Huron ; westward through the eastern arm of upper Michigan State ; southward through eastern Wisconsin in the ridge that divides Green Bay from Lake Michigan ; and then curves through northern Illinois into north-eastern Iowa. Artesian wells afford an abundant water supply in this ancient coastal plain south of the Wisconsin highlands. The Allegheny upland, bounding the lowlands in southern New York, fades away westward in Ohio ; an isolated upland, coal-bearing and forested like the Allegheny plateau, but subdued in form, occupies lower Michigan between Lakes Huron and Michigan. The lumber from this region has led to the growth of the city of *Grand Rapids*, where household furniture is largely made.

It is but natural that the international boundary should have followed the manifest line of the lakes and rivers, rather than the more irregular and less distinct line that marks the inner border of the ancient coastal plain ; and if by thus departing from one physical guide for another the United States have lost peninsular Ontario, they have gained the great mineral deposits of the upper Michigan highlands. It should be remarked that Lake Superior is unlike the other lakes in being unrelated to the belts of the ancient coastal plain. Its basin is an anomaly, a puzzle to the geomorphologist, who has not yet been able to give a good account of it. The basin must be of recent origin, for if ancient, it would long ago have been filled with sediments and converted into a plain.

The hills of the Allegheny plateau are not seen in Ohio west of Cleveland ; and with their disappearance a broad expanse of country opens towards the Mississippi, originally wooded in the east, a treeless prairie further west. This great extension of the Erie lowland is now divided into the States of Ohio, Indiana and Illinois. Little wonder that the early farmers of the rugged New England hills sent their sons out to this wonderful farming land of deep and rich soil. Little wonder that such of the European immigrants as did not stop in the Atlantic cities passed the uplands of the Allegheny plateau before settling upon their new homes. Little wonder that those who found so bountiful a welcome on the prairies, became Americanised in the first generation ; never has so composite a population been so rapidly unified. With free movement, with rapidly growing population, with wonderful increase in wealth, one here sees few of the old-fashioned ways of living that still remain in the enclosed valleys of the Atlantic highlands. The rough cabin or log house was usually replaced by a well-built frame cottage within the life of the first settler ; and his sons and grandsons, leaders in the growing communities, often occupy mansions of some pretension, albeit their architecture seldom follows classic lines.

The rivers at first served as important lines of travel and transportation. The growth of *Cincinnati* was for many years as much dependent on the trade that followed the Ohio river as on the rich farming country that

surrounded it. Canals were cut between the headwater branches of the Ohio and Mississippi and the waters of the Great Lakes ; the lakes themselves, consecrated to peace after the war of 1812, lie with extended shore lines along the northern border of the great fertile country, and a whole series of important cities has been built on their southern side—Buffalo, Erie, Cleveland, Toledo, Detroit, Chicago, Milwaukee. But important as the rivers have been and as the lakes are still, it is to the marvellous development of railroads on the level prairies that the industrial and commercial activity of the region is most largely due. Distance is their only obstacle, and that they overcome by building single tracks ; they have few cuttings or embankments, they cross each other on the level, and gather in tangled ganglia in many prairie centres like Columbus, Indianapolis, and Springfield. An open country, occupied by a few Indians a century ago, has suddenly become populous and rich, and the manufacturer and the railroad magnate take the place of the feudal baron of Europe.

Glacial action in the Ohio region.—Various geographical features have already been traced backward to their origin in past geological processes, and forward to their control over human distribution and occupations. This phase of geographical study nowhere receives more striking illustration than in those elements of form that have resulted directly or indirectly from the action of the ice sheets of the glacial period. It has been too generally the custom to set such subjects aside, as if they belonged only in the province of the geologist ; but in the Ohio region as in New England events without number, great and small, from trifling matters of individual action to momentous problems of national importance, have turned on the geographical results of ice action. Once recognised, their meaning cannot be neglected. The soils on which the richness of the Ohio region depends are almost wholly of glacial origin. Smooth sheets of till were spread out under the invading ice sheet where it could drag along no further the rock waste that it brought from nearer its source ; still smoother sheets of silt were deposited in various marginal lakes, large and small. Sheets of loess, ascribed to wind action by many observers, to turbid fluvial waters by others, are found in the southwestern part of the district, and reappear in greater force beyond the Mississippi. Far from being a destructive agency, the ice sheets and their associated processes were here largely constructive ; they buried the pre-existent topography, extinguished the pre-glacial drainage, and made the surface over anew. The soil of the till plains is more or less stony ; that of the silt and loess plains is almost impalpably fine. All are rich soils, for they consist in greatest part of pulverised rock, not exhausted by vegetable growth while weathering, but worn mechanically from its parent ledges under the desert ice sheets and in the ice-fed rivers.

The plains of till, silt, and loess are so extensive and continuous, that rock ledges are unknown for many miles together ; pre-glacial hills and valleys are completely buried over large areas ; it is only in the sides of

young valleys, recently cut through the glacial deposits, that the ledges are exposed. The geologist hardly knows where to draw the boundaries of rock formations ; he has to trust largely to the samples brought up from the wells and deep borings that have been made in search of oil and gas. The absence of trees on the prairies has been ascribed by some to the fineness of the soil ; by others, to Indian fires. It appears probable that both these causes have had effect. The climate of the region is certainly favourable, for trees flourish when planted. On the other hand, trees are absent from the western plains because of lack of rainfall ; and the blending of plain and prairie west of the Mississippi has sometimes given rise to the wrong idea that their treelessness was due to a common cause.

It may now be understood how strikingly the soil and the surface of the prairies north of the Ohio differ from those further south, as in the Blue Grass region of Kentucky. There the soil is of local origin and varies with the nature of the rock beneath ; hence the sharp contrast between the fertility of the Blue Grass district and the barrenness of the adjoining sandstone uplands already mentioned. In the glaciated region, local and distant materials are well mixed ; there is generally an excess of local material, but it seldom prevails in such quantity as to make the soil very much better or worse than the average. The hills of south-eastern Ohio, outside of the glaciated district, should be regarded as a part of the dissected Allegheny plateau ; but whatever hills there once were in north-western Ohio are now buried under the drift. One part of the State has many coal mines, the other has extensive farms. In the same way southern Indiana and Illinois, beyond the border of the drift, exhibit local details of topographic form dependent on rock structure, and accompanied by relatively sudden changes in the character and value of the soils, similar to those found south of the Ohio river in Kentucky ; the central and northern parts of these States are smoothly drift covered for scores of miles.

Corn (Indian corn, or maize) is the characteristic crop of the drift region from Ohio to Nebraska. Its growth is favoured by hot summer weather. Travelling by rail, one may pass miles and scores of miles of corn-fields, waving green in early summer, dull brown or gray in early autumn. Other grains are also raised in abundance. Great herds of cattle are pastured on the drift prairies, rivalling the product of the western plains. Roads very generally follow the north-and-south or east-and-west lines by which the land was originally divided for sale from the government to the people. Road-making is generally done by a scraping machine, which throws the soil from a ditch on either side to an arch in the middle ; in wet weather they have many sloughs, where waggon wheels sink hub-deep. In the villages and cities vitrified brick is coming to be largely used for paving, in the absence of good road metal. Barbed wire is now almost universally used for fencing on the treeless prairies.

The broad surface of the drift plains is here and there interrupted by looped belts of low hills, convex southward ; these are the terminal

moraines of the ice lobes into which the front of the glacial sheet was divided ; each trough of low ground on the north allowed the ice to move faster and further forward, while each district of higher ground, like the Allegheny Plateau of eastern Ohio, the uplands of lower Michigan, and the highlands of Wisconsin, retarded the advance. Although of moderate relief, the morainic belts are usually the only hills visible over hundreds of miles of prairie, hence they commonly serve to define the subdivisions between river headwaters, although not ranking as equals in this respect with the upland belts of the ancient coastal plain. The moraines have a moderately rolling surface, they are sometimes strewn with boulders ; their hollows contain numerous ponds and marshes.

Effect of Glacial Action on Drainage.—Rivers running from the glaciated area bore with them an abundant load of waste, and thus built up their valley floors into broad flood plains ; but since the disappearance of the ice and the decrease of the waste furnished to them, the rivers have trenched the valley flood plains, forming terraces, and sometimes producing falls and rapids where the entrenching streams have cut down upon buried ledges ; but the water power thus provided is much less than in New England, on account of the small relief of the region and the slow descent of the valley floors. The lakes which gathered on the land that sloped towards the retreating ice sheets marked their shore lines with beaches, many of which are so well preserved that they are used as naturally graded roads. The outlets of these glacial lakes were at the lowest passes across the height of land on the south. Strong rivers ran from the greater lakes, scouring out broad channels, now abandoned except by the waters of such small side streams as happen to enter them. A well-defined channel of this kind is incised to a slight depth across the drift-covered surface of northern Indiana, where the waters of the expanded Lake Erie (when its present outlet was obstructed by ice) ran out by the Wabash, Ohio, and Mississippi rivers. Another channel discharged the expanded waters of Lake Michigan to the headwaters of the Illinois river across the south-western border of the lake basin ; there an Indian portage was naturally found when white settlers entered the region ; a military outpost, Fort Dearborn, was established on this travelled path early in the nineteenth century, and there Chicago has since grown. The old channel of overflow has been a little deepened, a current of water is drawn through it from the lake to the Mississippi system, and the drainage of the city is thus to be disposed of in the future.

Chicago is the epitome and climax of the prairie and lake region. Its lofty buildings disclose a boundless prairie to the west and south, and a boundless blue lake to the east. No other city in America is the focal point of so many lines and systems of railroads. No other lake port has so valuable a commerce. No other city in the world has grown to so huge a population in so short a time—an empty prairie in 1830 ; more than a million of population at the close of the century. From an idle military

post, Chicago has risen in seventy years—the span of a single lifetime—to a sensationally active market for traffic in cattle, grain, and lumber; as the centre of trade for a vast region, it feeds the east and furnishes the west. The immediate site of the city had few advantages for the seat of a great population. The ground was so low and flat as to be poorly drained, and after the growth of the city had been well begun, the buildings and streets had to be raised to a higher level than that of the natural prairie. The lake shore was open to storms, and the little river that alone gave protection to shipping had to be enlarged like a canal before it could admit many vessels. To counterbalance these disadvantages, Chicago stands in the midst of a vast prairie region, at a point where all overland travel from the east must turn round the southern end of Lake Michigan on the way to the great North-West; and to this fact of general relations much more than to any immediate local advantage has the great city owed its growth. Rapid growth has not been altogether an advantage, for a city that has increased in population so fast as Chicago cannot have exercised a careful selection in the choice of its new members. Like other great cities, it exhibits many of the unattractive sides of human nature, but from about the time of the Columbian Exhibition of 1893, various signs of better growth have appeared. The innumerable railroads all originally crossed each other's tracks on the level, but the correction of this difficulty is now actively in progress. The immense wealth gathered in the city has found new application in the establishment of a university and a museum, whose development has advanced by wondrous strides. Already the centre of population has passed the meridian of Chicago. However important the harbour cities may be in relation to Europe, the great interior City on the Lake promises soon to outrank them in all domestic relations.

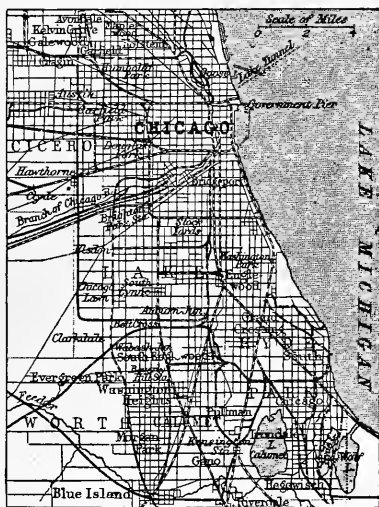


FIG. 359.—The Site of Chicago.

Niagara and the Great Lakes.—A whole series of events reaching from the close of the glacial period past the present into the future, associate Niagara river, the Great Lakes, and the city of Chicago in a most curious history. The lakes, except Superior, occupy lowlands or depressions which, as has been pointed out, are closely dependent upon the structure of the ancient coastal plain between the Laurentian highlands of Canada and the Ohio prairies. Although the problem of the

origin of the lakes is still unsolved, their history during the retreat of the latest ice-sheet has been well deciphered during the last twenty years, and now offers a consecutive story of extraordinary interest and importance to the geographer. As the ice withdrew from its last great advance numerous small disconnected water bodies were formed along its margin ; but as the retreat of the ice continued, the many small lakes coalesced into a few lakes of much larger size ; and ultimately perhaps all these were reduced to a single sheet of water of very irregular outline, escaping to the Mississippi by a single outlet at the site of Chicago. This outlet was probably maintained while the ice still lay heavily on the lands to the north-east ; but as the ice front withdrew, lower outlets were offered, first eastward by the Mohawk to the Hudson, then north-east by the St. Lawrence as to-day. As the change from the southern to the eastern drainage was approaching, a considerable river ran along the trough defined by the northern slope of the Allegheny Plateau in central New York, and the southern slope of the ice front ; this being known by the channels cut across the spurs of the plateau in the neighbourhood of Syracuse, where they are conspicuous features. Later on, when the eastern discharge was fully established, and the Chicago outlet was abandoned, the great marginal lake was divided into a larger western and a smaller eastern part by the Niagara upland between the Erie and the Ontario basins ; the latter overflowing down the Mohawk while the ice still filled the St. Lawrence valley, and afterwards sinking to a lower level when the St. Lawrence valley was opened. Several lines of discharge for a time flowed northward across the Niagara upland, and fell down its north-facing bluff into the lowland beneath ; but of these only the Niagara river has survived ; its fall has now been worn back nearly seven miles from its original position.

During all these remarkable changes the land was slowly rising in the north-east, as if relieved of the weight of the ice by which it had been for a time depressed ; this being known by the gentle north-eastward ascent of the earlier lake-shore lines. The change of level thus brought about had much influence in determining the location of the successive lake outlets. As the ice sheet uncovered the lowlands of south-western Ontario, a line of discharge was opened eastward from Georgian Bay at a lower level than the roundabout flow through Lake Erie ; and for a time the upper lakes were allowed to discharge directly eastward. During this interval only Lake Erie fed Niagara, and the part of the gorge then cut by the reduced river is much narrower than that of earlier and later dates. As the land rose in the north-east, the path of the discharge eastward from Georgian Bay became too high for the lake outlet ; hence the waters of the upper lakes again ran round through Erie, Niagara was restored to the full volume which it has since maintained, and the gorge was cut to full width again. A consequence of the variation in the width of the gorge is seen in the position of the two great railroad bridges by which it is crossed ;

they are close together, spanning the narrow portion of the gorge that was cut while the volume of the Niagara was diminished by the diversion of the upper lake waters to the more direct outlet across the Ontario district.

The rise of land in the north-east not only turned the discharge of the upper lakes back to Erie and Niagara, it raised all the lake waters on their south-western shores ; thus a number of little valleys were flooded into bays, furnishing harbours such as that which determined the location of *Toledo* at the south-west end of Lake Erie. By a similar movement, the water at the southern end of Lake Michigan has been raised again from the level that it must have had while the land was lower in the north-east and the eastward outlet was maintained from Georgian Bay ; thus the Michigan waters have returned very nearly to the level of the earlier time, when the northern end of the lake was blocked by ice, and the outlet ran south-westward past the site of Chicago. Not only so ; the rising of the land in the north-east and resulting change of water levels still continues, and at a rate rapid enough to be discovered in the brief period during which accurate measurements have been made of the lake waters. An examination of a number of authentic records by Gilbert has shown that there is a tilting of 0.42 feet in a hundred miles in a century. If continued, the backing up of the waters on the southern end of Lake Michigan will be much faster than their lowering on account of the work of Niagara in wearing down its falls ; and in two or three thousand years all the lakes but Ontario will again be tributary to the Mississippi river.

The Upper Mississippi River.—No one can say where the source of the Mississippi River lay in pre-glacial times. Its present head in Lake Itasca is not determined by the long and slow adjustments characteristic of river sources in mountainous regions, such as the Older Appalachian Belt of North Carolina, but by the accidental position of a small lake in a morainic region. Its upper course strays across a comparatively open country, guided as much by the irregular deposits of drift as by the form of the underlying rock. It has incised a narrow and shallow valley, but is still too young to have worn down its many falls and rapids. Settlements have sprung up at many of the water powers thus determined. The most important of these is *Minneapolis*, at the lowest and the largest of the falls, those of St. Anthony, now famous for driving extensive flour-mills, where much of the wheat of the north-west is ground. Between the neighbouring cities of Minneapolis and St. Paul the narrow valley of the young Mississippi joins a broader valley now occupied by the Minnesota river, but formed by the large overflow of the glacial Lake Agassiz. The broader valley is thenceforward followed southward, *St. Paul* standing on its border at the head of navigation ; and thus the "twin cities," too close together for the needs of the region, are forced into an over-active rivalry. Lake Pepin, a short distance below St. Paul, is an expansion of the Mississippi caused by an abundant deposit of drift that was washed into the valley by the Chippewa river from the north-east, probably at a time

when the volume of the latter was enlarged by contributions from the melting ice sheet. Further on, the river generally possesses a flood plain a few miles in width, bounded by strong bluffs which ascend to the rolling prairie; here the valley probably follows the course of the pre-glacial Mississippi; but occasionally the river trough is much narrower, as if the pre-glacial course had been obstructed by drift, and a new course had been carved in post-glacial time. Masterful as the river is, it cannot pretend to great antiquity. It is the modern representative of an ancient river, but it departs in many ways from the habit of its predecessor. A number of thriving cities of moderate size—*Dubuque, Davenport, Burlington, Quincy*—are built on the valley floor or border; their first advantage coming from the great north-and-south waterway; but to-day the river is of little importance as compared to the railroads running east and west. Indeed, the river is now more of an impediment from having to be bridged, than an advantage as a public highway.

The Ohio River.—The Ohio and its northern branches resemble the upper Mississippi system in many ways. Its trunk stream is now old enough to have opened a good flood plain between the enclosing hills. The head waters rise on drift barriers, by which the pre-glacial drainage system has been greatly modified. Many valleys that formerly discharged to Lake Erie are now blocked by moraines, and turn part of their waters to the Ohio. There is growing reason for the belief that a number of streams from as far south as the West Virginia plateau originally ran northward across Ohio to Lake Erie; that an ice blockade of their lower (northern) courses in an early epoch of the glacial period caused them to rise in lakes and overflow westward across the hills at the lowest passes they could find; and that in this accidental way the upper and middle Ohio valley was developed. If so, this river, by which so many settlers found their way to the prairies, is an indirect consequence of glacial action, like the water powers on which the manufactures of New England at first depended. Only the southern branches of the river can lay claim to great antiquity. *Cincinnati* and *Louisville* are the chief cities on the middle Ohio; both profiting more largely to-day from the rich agricultural districts behind them, and from the railroads that lead across country, than from the rivers to whose advantages their location was originally due. Coal and lumber is still floated down the river from the hills of the Allegheny Plateau; but the large river steamboats and their voyages from Pittsburg to the Mississippi are almost things of the past. Small river-boats to-day have a share of local traffic, but the railroads absorb nearly all the long-distance transportation.

All these rivers are subject to severe floods, those of the Ohio being especially disastrous; many of its branches, especially in the plateau district, gather rainfall rapidly from their steep valley sides. No lakes are present to equalise their discharge, the Ohio being strongly contrasted with the St. Lawrence in this respect. A destructive rise of from forty to

sixty feet, submerging the whole valley floor, and drowning the streets of many a village, must be expected once if not oftener in a decade.

The Climate of the Ohio Region.—Cold winters and hot summers, with an equable distribution of rainfall through the year, are the leading features in the climate of the Ohio region. The hot summers are so productive that the cold of the winters is easily survived. The position of the region between the warm Gulf of Mexico on the far south, and the open plains of Canada on the far north-west, gives an unpleasant violence to its weather changes. The light southerly winds that prevail in front of cyclonic areas in midsummer cause excessive temperatures with high humidity under a hazy sky; prostration from sunstroke is of common occurrence in the cities during these spells of true "sirocco" weather. The Atlantic cities are subject to the same affliction, but seldom of so great severity as on the prairies. As the cyclonic centre passes eastward, the wind shifts to west or north-west, the sky clears to a bright blue, and the temperature falls to a moderate degree. Violent thunderstorms and tornadoes often mark the transition from one weather type to another. In contrast with these excessive heats of summer and their cool waves are the mild southerly winds of winter and their cold waves; the latter are piercing blasts that sweep suddenly down from the Canadian plains, reducing the temperature to zero or lower, and causing sudden frost after the thaw of the southerly winds. Like the warm waves of summer, the cold waves of winter reach the Atlantic coast, even as far south as Florida, but with diminished intensity as they move forward from their remote northern source.

THE SOUTHERN COASTAL PLAIN

The Southern Coastal Plain.—The account already given of the Atlantic Coastal Plain as far south as the Carolinas prepares the way for following its extension westward, where it wraps around the southern Appalachians and turns into the Mississippi embayment. The mountains gradually decrease in height, although preserving their disordered structures in full strength, and thus disappear below the covering strata of the coastal plain in northern Georgia and Alabama. With the burial of the mountains, the granite and marble quarries of the older belt, and the coal and iron mines of the newer belt, give way to the agricultural industries of the plain. The plain is well dissected and hilly in the interior, with local relief of from two to four hundred feet; it gradually descends towards the coast, and there falls to broad prairies, recently emerged from the waters of the Gulf, still flat and marshy. Pine forests cover much of the region, yielding valuable lumber as well as resinous products. The population is generally rural or gathered in small villages; even the largest cities are of moderate size. Middle Alabama offers the only peculiar feature that deserves special description; this is a belted arrangement of form, such as has been described for New Jersey. An inner lowland

borders the older land of the Appalachians; an upland known as Chunnenuge Ridge encloses the inner lowland; and the outer slope of the "ridge" descends to the flat coastal prairies. The inner lowland has

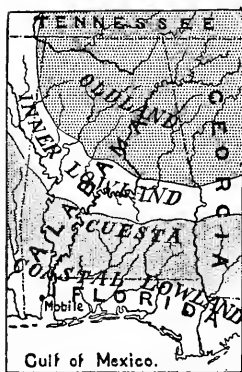


FIG. 360.—The Alabama Coastal Plain.

been worn down on a weak, loose-textured limestone; its flat surface is covered by a rich soil, and here is the chief cotton belt of the State with the largest cities of the agricultural district. Being without good road metal, the roads are often impassable in the spring; the traveller must then mount a horse and take to the fields. The "ridge" stands up because its strata are more resistant than those of the inner lowland; being sandy for the most part, their soils are relatively infertile. The coastal prairies are low, because they have never been uplifted high; they are smooth because they cannot be dissected while standing near sea-level. *Mobile*, at the head of a bay formed by drowning the lower valley of Alabama river, the result of a slight depres-

sion of the region, is the chief port of the Gulf coast, east of the Mississippi.

Slavery.—The Southern Coastal Plain is chiefly responsible for the grievous affliction of slavery that so long blighted the southern States and poisoned the whole country. The settlements of the whole Atlantic coast were at first to blame for the iniquity, for slaves were originally held in New England as well as in Virginia and the Carolinas; but in the north slave labour was of so little profit that sordid motives did not deceive the awakening conscience of the people; and before the system gained a strong hold it was uprooted. In the south, on the other hand, slave labour on the plantations became extremely profitable; and moreover, the heat of summer, it has often been asserted, was too severe for white labourers. The principles of the people very naturally followed their profitable practice, and slavery became an established institution. The population was thus divided into three chief classes, the white slaveholders, the land-owners and leaders, financially and politically, of the south, men of wealth, ability, and high position; the poor whites or "white trash," in large part the descendants of very undesirable colonists of early days, owning no slaves and very little property, lazy, ignorant, and poverty-stricken, despised by both the other classes; and the negro slaves, with no property or influence whatever. To these three classes a fourth may be added; the sturdier people of the uplands, inland from the coastal plain, often owning no slaves, sometimes owning a few, not profiting enough by the system of slavery to be strongly attached to it, yet not sufficiently wealthy or politically important to exert much influence, and too generally casting what influence they had with the more ardent slaveholders as against the people of the north.

If the distribution of the wealthy and the influential slaveholders were charted, it would be found to be closely associated with the Southern Coastal Plain, and especially with the belts of richer soil. The piedmont border of the Appalachian belt, the inland Appalachian valley (the Shenandoah valley of Virginia and the Valley of East Tennessee), the flood plain of the Mississippi and the isolated limestone basins of western Tennessee and northern Kentucky (the Blue Grass country) were also profitable slave-holding districts; but the stronghold of the system was on the coastal plain. Better that the plain should never have grown a pound of cotton, better that its fertile strata should never have emerged from the waters of the sea, than that slavery and its direful, long-lasting consequences should have come upon the United States. Now after a dreadful struggle, slavery is abolished and better conditions are

ushered in. Considerable sums of public money are devoted by the several States to the education of the negroes, but always apart from the whites; many schools are supported by contributions from the northern States; some advance is made in the ownership and cultivation of land and in the practice of trades; but political rights are practically withheld from the former slaves; there is still a great body of poor and ignorant negroes—often a majority of the population—set apart from the whites by all the prejudices that divide the races of mankind. The coastal plain has much to answer for, in so far as it led to this unhappy condition.

Florida is an anomalous out-growth from the Southern Coastal Plain, a low up-arching of the sea floor, nowhere reaching more than a few hundred feet above sea-level. Much of its interior is underlain by limestones; here numerous lakes are found as if occupying cavities dissolved out of the soluble rock, and many streams disappear in "sinks," emerging elsewhere in large springs. Nearer the coast the land is low and often marshy, especially in the south where the grassy Everglades form an impenetrable wilderness, and where the shore line is often bordered by mangrove swamps, especially on the western side. Remnants of Indian tribes are still found in this untamable country. The eastern coast is bordered by extensive sand reefs with remarkably even shore lines, enclosing long narrow lagoons. In Florida, as well as further north to Carolina, there are strata so rich in phosphatic deposits—largely derived from the bones of sea animals—as to be valuable as fertilizers; they are already

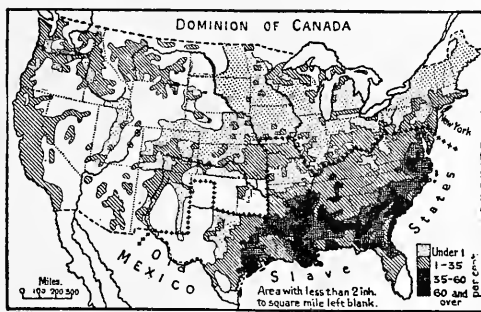


FIG. 361.—The Old Slave States and the present Distribution of Negroes.

excavated in shallow pits and exported in considerable quantity ; but this industry is only in its infancy, awaiting the further exhaustion of the soils in the northern farms for its full development. The southern extremity of Florida and the outlying islands are coral reefs ; in part slightly elevated and worn down again ; in part growing at sea-level ; thus resembling the extensive banks of the Bahamas to the south-east.

The far southern reach of Florida between the Atlantic and the Gulf waters gives it an almost torrid climate. It has a plentiful rainfall, with a stronger maximum in summer than is found anywhere else in the United States. Tropical cyclones frequently pass the Florida coast in the late summer or early autumn, on their curved track between the West Indies and the North Atlantic. They sometimes cause disaster on the low coastal lands by brushing the sea-water ashore in storm tides, as well as by overwhelming the unwary mariner ; but their coming is generally announced by the Weather Bureau. The mild winters of Florida attract many invalids from the more severe climates of the northern States. The high mean temperature permits the cultivation of subtropical fruits, which are sent in large quantities to the northern markets ; but a cold wave occasionally sweeps down from the north-west in the late winter and freezes the orange trees and early vegetables ; hence fortunes have been lost as well as made in the orchards and farms of Florida. *Key West*, on an island off the south end of the peninsula, is the United States naval station for the Gulf.

The Lower Mississippi.—During the deposition of the strata of the Southern Coastal Plain, a strong embayment occupied the place of the lower Mississippi. As the region was elevated, many rivers, formerly independent, were engrafted on a single trunk, and thus the “father of waters” was formed. The upper Mississippi deserves no higher rank than the Ohio and the Missouri ; indeed, in the matter of age, the Ohio headwaters in the Black Mountains of North Carolina and the Missouri headwaters in the Rocky Mountains of Montana, Wyoming, and Colorado, are much more venerable than the post-glacial parvenus of the upper Mississippi in Minnesota ; but the lower Mississippi combining them all is truly a great river. The early French explorers of North America entered the interior by its two chief waterways, the St. Lawrence and the Mississippi. Their presence is revealed by many names still in use, such as Quebec and Montreal, New Orleans and Baton Rouge, St. Louis and Louisiana. The defeat of the French at Quebec transferred all their possessions on the northern river to British control. The purchase of Louisiana brought a western empire into the possession of the United States. In both cases the upper basin of the river followed the fate of the mouth.

Although bearing a heavy load of silt, the great volume of the Mississippi enables it to establish a channel of very gentle slope. Its vigorous meanders, swinging now this way, now that, have alternately worn back the bluffs on the east and west so that the flood plain has gained a breadth

of from thirty to sixty miles over a length of 600 miles. The greater part of the plain slopes gently away from the river banks, and is therefore liable to be flooded at times of high water. Hardly a year passes but a moderate flood occurs in one part or another; hardly a decade without a devastating inundation. Near the river the plain is partly cleared and cultivated: its rich soil produces abundant crops of cotton and sugar cane. Further back upon the river a great part of the plain is not yet cleared. Southward, the flood plain continues into the delta, which is rapidly building forward into the Gulf. The river there divides into a number of outgoing branches or distributaries, each of which is enclosed in its furthest advance by low and narrow banks of mud. Few deltas in the world more clearly exhibit in their digitate outline the intention of their river; few are more indifferent to the desire of the waves to turn their front into a smooth convex curve. The mouths of the distributaries are known as "passes"; at one of them, jetties have been formed to confine the river breadth, increase its velocity, and thus cause it to scour out a deeper channel for the advantage of navigation. No large cities have grown upon the flood plain except *New Orleans*, the chief city of the Gulf coast, the harbour city where internal and external commerce meet. Its population contains many Creoles—Americans of French ancestry—and many Italian immigrants.

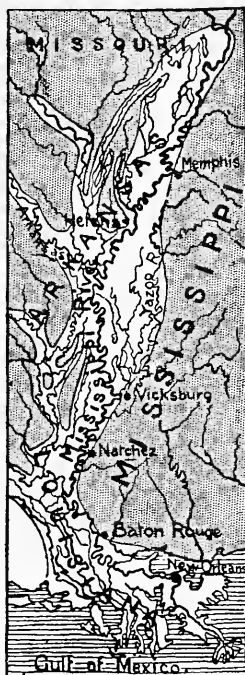


FIG. 362.—The Mississippi Flood Plain (white).

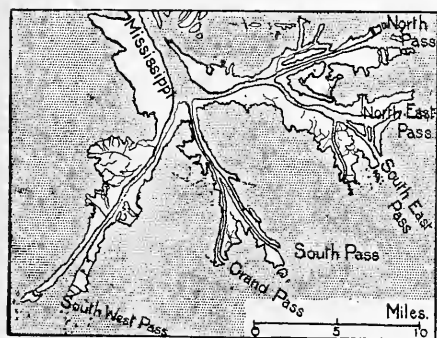


FIG. 363.—The end of the Mississippi Delta.

ing with planters and gamblers, and of seeing a cargo of "slaves, cotton

and other merchandise." The trip may still be made; there are still shifting sand bars on the "crossings" between the river curves, and there is still



FIG. 364.—The Site of New Orleans.

a great extent of unoccupied forest along the river banks; but here, as well as further north, the rapid transportation of the railroad is largely replacing the slower movement of the river boat, except for local traffic supplied by the settlements on the flood plain itself. Between New Orleans and St. Louis, the chief settlements are at points where the swinging river touches the bluffs on one or other side of the plain. Happening in this century to lie nearer the eastern side of the plain than the western, Memphis, Tenn., Vicksburg, Miss., and Natchez and Baton Rouge, La., are

on the eastern bluffs. Helena, Ark., is the only important city on the western bluff below St. Louis. To these must be added Cairo, Ill., at the junction of the Ohio and Mississippi. If engineering skill ever suffices to control the floods of the Mississippi, to restrain the shifting of its meandering channel, and to drain the "backswamps" of its flood plain, the whole surface may be cultivated. Already some steps have been taken toward this profitable end. A Mississippi River Commission has constructed elaborate maps of the river, and extensive dikes or "levees" are constructed along its banks. Another century may see great advance made from this beginning, and then the product of the Mississippi flood plain will be proportionate to its vast extent and its inexhaustible fertility.

TRANS-MISSISSIPPI STATES

The Trans-Mississippi States.—The tier of States from Minnesota to Louisiana immediately west of the Mississippi presents an epitomised review of what has already been described. Northern Minnesota is an extension of the Laurentian highlands, a region of ancient rocks worn down to moderate relief, rich in iron ores. It is abundantly strewn over with sheet drift and heaped moraines enclosing innumerable lakes. Its northward slope, with that of eastern North Dakota, drained by the Red River of the North, was the seat of the vast glacial-marginal Lake Agassiz, stretching far north into Canada against the retreating ice, and overflowing at a dip in the height of land on the south, where the channel now followed by the Minnesota river was cut. The shore lines of the lake and the deltas of inflowing rivers on the east and west are not less distinct than the channel of its outlet, although now abandoned by the waters that made them. As with the Laurentian glacial lakes, the shore lines of Lake

Wisconsin highland. There is the same general concealment of rock ledges, except in the banks of the post-glacial stream courses ; the same wide expanse of gently undulating plains of till, the same ornamentation by belts of hilly moraines. Most of the surface is treeless prairie, very fertile and widely cultivated. Many villages and small cities have sprung up, but there are as yet no large cities. Railroads are almost as plentiful as east of the Mississippi. There is no part of the United States in which the succession of earlier and later drift sheets is so well displayed. In the northern part of this district the forms produced by the ice are hardly modified, except close to the sharp-cut stream lines ; the till plains are still undissected, lakes are still present in the moraines : here the drift is very young. In the southern part there are no lakes and the surface of the drift is well carved by numerous branching streams into an undulating surface : here the drift is comparatively old. The interval between the earliest and latest ice advances must have been much longer than between the latest advance and the present day. The fertile loess mantle that so generally cloaks the more southern drift is distinctly associated with one of the earlier advances ; the latest advance produced no loess, but gave forth energetic rivers that bore streams of gravel along the valleys far beyond the terminal moraines.

Tornadoes of the Mississippi Basin.—The plains immediately to the west of the Mississippi vie with those immediately to the east of the

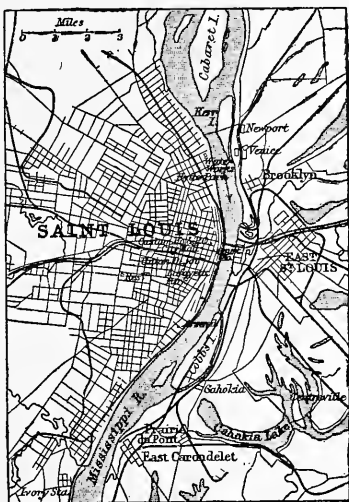


FIG. 365.—*The Site of St. Louis.*

river in affording opportunity for the development of tornadoes during the spring and summer months. These violent and destructive whirlwinds are now shown to be almost limited to the south-eastern quadrant of large cyclonic or low pressure areas, in that part of the cyclonic track and in that season which provides strong contrasts of temperature and humidity in the inflowing winds. The same great cyclonic storm, a thousand miles in diameter, may be followed in its eastern progress all across North America, and far out upon the North Atlantic even to north-western Europe. The general circulation of its whirling indrafts is alike during its entire journey of five or ten thousand miles; but only on passing the middle Mississippi basin in spring or summer are tornadoes frequently developed. They occur within thunderstorms, but by no means within every such local storm; hence it may be inferred that their development depends on highly specialised conditions, such as warm and moist southerly winds in the lower atmosphere, and a probable overflow of cool and dry westerly winds aloft. The destructive tornado whirl, within which hangs a writhing funnel-shaped cloud, is seldom over a thousand yards in diameter. It travels rapidly, usually from south-west to north-east, averaging thirty miles an hour, while the velocity of the winds themselves must exceed a hundred miles per hour. The storm comes out of the cloudy west with little warning, lays waste its narrow path with a frightful roaring, and quickly disappears across the prairie. Trees and buildings are violently destroyed in a moment, if the full force of the whirl comes upon them. Little wonder that those who have witnessed but escaped a tornado's fury are nervously apprehensive when dark clouds gather over the western horizon in sultry summer weather.

The Missouri Highlands.—The Missouri river roughly follows the border of the drift area on the west of the Mississippi, as the Ohio does on the east. There is some reason for thinking that the course of the river was determined when an early ice sheet lay on the country to the north-east of it, thus increasing its resemblance to the Ohio. It is now a well established river, with a flood plain generally several miles wide, incised one or two hundred feet below the uplands on either side. Many towns, like Jefferson City, the capital of Missouri, occupy the bordering uplands where the swinging river impinges against the base of the bluff; thus showing that here, as on the Ohio, river travel was important before the days of the railroad. Now many steamboats are rotting at their wharves.

South of the Missouri, the land rises gradually to the Ozark Plateau (Oz in Fig. 353), a broad flat dome of Palæozoic strata, in general less dissected, but singularly like the Allegheny plateau in many respects. The uplands include a number of ragged *cuestas*, that is, reliefs determined by the harder members of the plateau strata whose gently inclined position causes them to form escarpments of irregular front, two or three hundred feet in height on the outcrop side, but descending slowly to lower ground in the direction of their dip; the belt of lower ground between the back slope of

one cuesta and the escarpment of the next being the surface expression of the weaker strata that lie between the cuesta-makers. The chief river valleys are cut down beneath the level of the belts of lower ground, and are therefore doubly deep in their passage through the uplands of the cuestas. They are generally steep sided and narrow floored: some of them have singularly meandering courses, like that of the Osage. The population is gathered on the broader interstream uplands, and is almost exclusively engaged in agriculture. The chief exception to this statement is found in the St. François Mountains, eastward from the higher parts of the plateau, where iron mining flourishes; this being the natural result of the emergence here of several ancient mountain summits that rise through the stratified rocks of the plateau from a buried Archæan land surface. Iron Mountain is one of these summits; Pilot Knob, a landmark seen from afar, is another. The plateau slowly decreases in height and increases in ruggedness on approaching its border in northern Arkansas. Across its whole breadth, there is an increase in the abundance of natural tree growth, in contrast to the treeless prairies of Iowa; the rugged southern part of the Ozark Plateau is abundantly forested and thinly inhabited.

The Arkansas Highlands.—The lower country of central Arkansas, next beyond the southern border of the Ozark Plateau, is determined by the upturning of the strata, which from the beginning of their overlap on the Archæan floor of northern Minnesota had been almost horizontal. The denuded folds of the crushed rocks form the Ouachita Mountains, occupying a belt that trends east and west across middle Arkansas, disappearing under the embayment of the Southern Coastal Plain to the eastward, and extending far into the dry country to the westward (Ou in Fig. 353). Here so many repetitions of the Appalachian structure and form have been found that the Appalachian mountain-making disturbance of Permian time is now recognised as extending far beyond the limits originally assigned to it in Alabama. The harder strata stand up as ridges of moderate height, turning in angular zigzags of true Appalachian habit; the streams cut through the ridges in sharp water gaps; the farming country lies in the basins and "coves" divided by the ridges. Certain sandstone layers in the ridges are of extremely fine texture and are extensively quarried for whetstones.

The uneducated population of the South is at its worst in the "piney woods" of central Arkansas. Whether because of inferior ancestry or because of the blight of slavery, the people of the country districts, white as well as black, are here miserably degraded. As so often elsewhere in the South, the shiftless farmers often buy seed for spring planting with money borrowed on the prospect of the autumn's harvest. They show little desire to improve their condition, and remain ignorant, badly housed, roughly clothed, and poorly fed from generation to generation. Some of the inertness of the people may be charged to the extreme heat of the summers; but from whatever cause, their slow progress makes a sad

contrast to the rapid emergence from frontier conditions in such States as Wisconsin and Iowa. Amid rural surroundings so deplorable, it is natural that the urban population should grow slowly, and that manufacturing and mercantile activity should be at the lowest ebb. *Helena* on the Mississippi and *Little Rock* on the Arkansas, the chief cities of the district, are only of local importance.

The Red River Rafts.—Southern Arkansas is overlapped by the coastal plain which continues through Louisiana to the shore of the Gulf of Mexico, repeating many of the conditions already described for the region east of the Mississippi. Much of the surface is still forested, and the population is almost entirely rural and agricultural. The flood plain of the Red River deserves mention among the physical features on account of the famous “rafts” by which the river channel through it has been encumbered for distances of twenty or more miles. The rafts are formed by the accumulation of tree trunks that have been swept in time of flood from the forested flood plain further up the valley. The older trunks rot away at the lower end of the raft, while new ones gather at the upper end; thus the raft slowly moves up stream. In recent years a navigable channel has been opened through the raft above *Shreveport*, and kept clear by patrolling “snag-boats.” Appropriate to the slow progress of the region, river transportation has not been so generally superseded by the railroads here as in the north. Partly on account of the obstruction of the river current by the raft, partly on account of the large amount of sediment brought down from the upper waters in the *Llano Estacado* of Texas, the flood plain of the Red River is rapidly aggrading or building up the valley floor. The side streams in Louisiana, unable to aggrade their valleys at the same rapid rate, expand on approaching the main valley, and thus form a number of lakes of unusual origin. The coastal prairie offers little temptation to settlement. Its surface is so low, flat, and marshy as generally to be unfit for cultivation; its shore possesses no good harbours, and is subject to storm floods from the sea.

The Coastal Plain of Texas.—The Southern Coastal Plain extends south-westward into Texas. Its shore line sweeps in a long concave curve from the fingered delta of the Mississippi to the rounded delta of the Rio Grande. For nearly all this distance the low margin of the plain is bordered by off-shore sand-reefs, built by wave action in the shallow waters of the Gulf. The reefs are of extraordinary continuity, by reason of the weakness of the tides. Padre Island, the reef that extends northward from the Rio Grande delta, measures nearly a hundred miles without a break, and in this respect is strikingly unlike the broken reefs and sea islands of South Carolina, where the much stronger tides maintain many openings leading from the mainland to the sea. Texas is so poorly provided with harbours that its chief port, *Galveston*, is situated on one of the off-shore sand reefs, where it was devastated by a hurricane and simultaneous sea-flood in 1900. The other ports are on shallow bays (valleys in the

coastal plain, slightly drowned), accessible only to vessels of moderate draught through narrow inlets of the sand-reef.

The coastal prairie is treeless except along the watercourses ; it forms a vast grazing country. Further inland, the surface rises slowly, is dissected into a hilly expression, and is more generally wooded. Then follows the black prairie of smoother surface and more fertile soil, a great cotton district, like that enclosed by the Chunnenugga Ridge of Alabama. Here are the chief interior cities, including *Austin*, the capital. Finally, the long slope of the Grand Prairie, a Cretaceous cuesta of large dimensions, ascends to uplands of considerable altitude before descending by a ragged escarpment to the "central denuded region," a farming district of ancient rocks and diversified structure, form, and resources. The Cretaceous cuesta is traversed by valleys that lead rivers outward from the interior denuded region ; but between the valleys its upland surface is relatively continuous, a great uniform expanse. Here already the rainfall is becoming deficient, foreshadowing the aridity of western Texas. The "Northers" of the Texas coast are winds that sweep down from the Great Plains, when a cyclonic area lies on the Gulf : in winter they are cold waves.

THE GREAT PLAINS

The Great Plains.—A vast sub-arid region, extending from the trans-Mississippi tier of States to the base of the Rocky Mountains, is known as the Great Plains. The eastern boundary of this division is indefinite ; the dry plains merge into the more fertile prairies in the eastern part of the second tier of States west of the Mississippi. The plains are more varied in form than the name implies, and are indeed hilly enough over large districts to be called rugged. Even where most nearly level, they generally roll in broad swells, whose variation of height is frequently to be measured in scores of feet. Moreover, most of the rivers of the plains have incised their valleys to depths of fifties or hundreds of feet below the interstream surfaces ; and the branch streams, gnawing headwards, produce a broken country on either side of the main valleys that is anything but plain. A dry climate excludes growth of trees, except along the streams, or on the higher hills and escarpments ; and the name of the region is more an expression of the almost boundless view disclosed from every eminence than an indication of its precise form.

The dryness of the plains predestines them to a small population. To-day, with the advantages of many railroads, the traveller is impressed with the great amount of unoccupied space. Yet from this vast region, once deemed almost a desert, cattle are now shipped in great numbers to the more eastern cities, although they require a much greater grazing area than on the prairies. The Côteau of the Missouri in North and South Dakota, where the Great Plains enter the United States from Canada, is a broad upland, that descends with some approach to abruptness on its eastern side

into the lower ground drained by James River : it is the topographical expression of a series of Cretaceous strata which extend far west and south under the plains, and which here crop out to the eastward ; it may be taken as marking the transition from the moister climate and more plentiful grass covering of the prairies further east, and the dryer climate and scanty grass covering further west. The upland is belted over with many moraines of rolling, hummocky, boulder-strewn surface, not high enough to be formidable, but uneven enough to be fatiguing to the drover, teamster, or horseman, and too stony to yield easily to the plough. In the absence of landmarks, one may easily be lost among the morainic hills and hollows. The abandoned channels of large glacial rivers are characteristic features of the drift-covered uplands ; one may sometimes ascend the gentle grade of their broad floor between well-marked banks, and at last emerge on the top of a morainic belt, with a broad stretch of lower ground beyond ; here the channel heads against the air, and here the source of its extinct river in the edge of the ice sheet must be inferred. The blizzard finds its best development on the broad Côteau. It is a violent cold-wave wind, at a temperature near zero F. or lower, drifting clouds of fine snow by which all landmarks are hidden. A guide of rope is needed in going a few hundred feet from a house to a barn in one of these freezing, blinding storms. Travellers on foot should be roped together, as if climbing Alpine peaks.

Beyond the Missouri to the Rocky Mountains in Montana, there is a great space of comparatively even plains, interrupted only by occasional eminences and by the sharply incised valleys of the larger rivers and their short branches. The eminences are of various types. The Little Rocky Mountains, near the Canadian boundary, are local upheavals of the underlying strata in a dome-like structure, now much denuded. The Bear Paw Mountains, also far north, are a group of peaks formed by the dissection of an ancient volcano. The Highwood and the Crazy Mountains, between the Missouri and Yellowstone rivers, owe their altitude to the network of igneous dykes and stocks which have locally indurated the enclosing strata. Various ridges, buttes, and mesas are the consequence of the better resistance to erosion of dykes and lava sheets, than of the weak strata of the plains. Taken altogether, these embossed forms prove that the surrounding plain is not smooth because it retains the form of the sea floor in which its strata were laid down (like the coastal prairies of Texas), but because it has been well worn down from whatever initial upper surface it once possessed. It is a true plain of denudation, with the remnant hills and mountains here and there to serve, like once overwhelmed nilometers, as minimum measures of the height to which the entire surface once rose. As a plain of denudation, the region must have been worn down so low that the rivers wandered idly upon its surface. The sharply intrenched valleys of to-day prove that the denuded plains have been broadly uplifted, with an inclination eastward, and this only long

enough ago to allow vigorous rivers to erode narrow valleys. There are few better examples of composite topography than this.

Hills of the Great Plains.—The hills and mountains that rise over the plains bear trees on their upper slopes. The plains are absolutely treeless, but offer good grazing ranges, and are now stocked with wandering herds of cattle. Although the winters are cold, the snowfall is very light ; the cattle are left unsheltered on the open ranges all the year round, to get along as well as they can ; they generally endure their winter privations, but severe losses occur during blizzards. Sheep cannot survive without protection and food. There is a tendency among the ranchmen to carry the name of "Prairie" far west to the thinly grassed upland plains, but thus used, the word is a deceptive misnomer. The uplands are out of reach of irrigation, but the valley floors, half a mile or more in width, are often watered by canals from the rivers : here cultivated fields produce good harvests. All the settlements are on the rivers : *Bismarck*, where the Northern Pacific railroad crosses the Missouri, *Fort Benton*, an early military station at the head of navigation of the Missouri, and *Great Falls*, where the revived river has developed a number of cataracts on a series of resistant sandstone layers, are examples ; the latter uses its water power in various industrial works, as well as in driving street cars and in furnishing electric light. The homes of the cattlemen are likewise in the valleys, out of sight of one another and widely separated by the unoccupied plains. Important Indian reservations lie near the mountains, where the Red Man still remains in large numbers. The denuded plains extend along the Rocky Mountain border far south into Colorado, repeating the features above described except that the residual hills are comparatively rare. Here the upland surface is often strewn over with sheets of river-washed gravels, derived from the mountains, and of practical importance as water-bearing deposits. As in Montana, the rivers are now intrenched in valleys beneath the upland surface.

The Black Hills, in South Dakota and Wyoming, occupy an oval upheaved area, measuring about a hundred miles in its longer north and south diameter (BH in Fig 353). It is a dome-like mountain uplift on a scale intermediate between that of the Little Rocky Mountains of eastern Montana and of various members of the Rocky Mountains proper. Although the covering strata of the dome-like uplift have been greatly denuded, the hills surmount the plains by one or two thousand feet, and thus induce a local increase of rainfall. The Black Hills are, therefore, well forested, and their dark appearance, when seen in the distance, has given them their name. They supply much lumber to the ranches on the surrounding plains. The denudation of the originally arching strata has worn them back to concentric rimming ridges, and has revealed their foundation rocks of very ancient origin : and as these bear gold and silver, mining has come to be an important industry in the hills. Two railways have pushed their lines from the prairie States across the eastern plains to the Black

Hills, and now compete for freights from the mines as well as from the cattle ranges on the way. Here, as so often elsewhere, strong buttes mark the site of heavy "necks" of volcanic rocks and testify to the great and general denudation that the hills and plains have suffered. Mato Teepee, north-west of the hills, is the most remarkable of these forms, a great bare rock-shaft of columnar structure, six hundred feet in height, without a rival in the world.

The Bad Lands—the *mauvaises terres pour traverser* of the early French *voyageurs*—are named from their excessively rough and barren surface, the result of minute and detailed dissection by wet-weather streams. They are found in many parts of the western arid country, nowhere in better or greater development than along the branches of the Missouri north and south of the Black Hills. The fine-textured strata thus carved are in many cases of lacustrine or fluvial origin and of Tertiary age; the result of accumulation in broad basins formed by slight warpings of the Great Plains. A wonderful series of mammalian fossils has been entombed in them. The dry climate of the plains allows only a scanty covering of vegetation; the fine texture and imperfect consolidation of the lacustrine strata promotes their denudation. Similar strata in a moister climate would be so well covered by vegetation that little work would be done by small streams and rills; most of the waste would wash evenly from the slopes to the larger valleys, or would creep slowly down hill in soil-cap motion, and the forms of the surface would be smoothly rounded. It is curious to note that in such cases, the vegetation supported under the greater rainfall largely counteracts the work that the rainfall would do alone; it is in dry regions that the direct work of small streams is best displayed, even though their action is intermittent.

The Sand Hills.—North of the Platte River a large extent of the Great Plains in Nebraska is occupied by low sand hills, or dunes, heaped by the wind from incoherent sandy strata. There is a scanty growth of grass in the hollows between the hills, and here, as well as elsewhere on the plains, great herds of buffalo wandered in the first half of the nineteenth century. But explorers and emigrants looked on the region as a desert, for it gave them little support during the slow progress of their waggons or "prairie schooners" across its monotonous waste. Yet to-day a railroad traverses this "desert" on its way to the Black Hills, and carries many cattle from ranches among the sand hills to eastern markets.

The loose texture of the strata of the plains exert an influence on the behaviour of its rivers as well as on the form of its bad lands and its sand hills. The rivers are so abundantly supplied with the waste of the land that they need a relatively strong slope on which to gain a velocity that will enable them to wash along their load. Hence, in spite of the considerable altitude of the plains—3,000 or 4,000 feet over vast areas—the valleys are of moderate depth, and the local relief is, therefore, less than it would be if the strata were more thoroughly indurated, and the valleys

more deeply cut. The Platte illustrates this principle in a striking manner, for its broad channel is little sunk below the adjoining plains. Its visible volume decreases by sinking underground from a good supply near the mountains to a comparatively slender stream wandering on a broad bed of sands in the sand-hill region. Only in occasional floods is the channel filled from bank to bank.

The Plains of Kansas ascend westward in a series of broad benches that are separated by east-facing bluffs of moderate height and ragged outline. These are similar to the belted uplands or *cuestas* of southern Missouri: each bench is underlain by a relatively resistant stratum, whose outcrop forms its limiting escarpment. The flood-plained valleys of the larger streams have little relation to the *cuestas*, but traverses them irregularly. While the eastern part of this region generally has a sufficient rainfall, the western part of Kansas reaches an arid region whose settlement has been attended by much misfortune. The practice of borrowing money with which to stock a new farm was here organised by loan companies; and it happened that between 1880 and 1890, when this business was at its height, the rainfall on the Great Plains was heavier than usual, and for a time all went well. Many enthusiasts believed that the climate had been favourably changed by the cultivation of the ground. Then in one of the times of decreasing rainfall, common to all semi-arid regions, crops failed, the disappointed settlers left their farms, and the eastern investor found himself the owner of a distant patch of worthless ground on the boundless plains. The legitimate use of borrowed capital in eastern Kansas and Nebraska, as well as on the prairies, has been beneficial both to borrowers and lenders in many cases where the farms were favourably situated, but the plains are still desolate; little settlements here and there in the valleys only emphasise the emptiness of the uplands.

Omaha, in Nebraska, and *Kansas City*, on the border of Missouri and Kansas, both on the Missouri river, are the chief cities of the western prairies, near the eastern borders of the plains. They have grown rapidly during the latter decades of the century, with the extension of railroads across the plains and the growth of cattle ranching. They are rivals as railroad centres and as cattle markets.

The Llano Estacado.—The Ouachita mountain range of middle Arkansas extends westward into Indian Territory and Oklahoma, interrupting the plains for several hundred miles, but disappearing beneath them before reaching the Rocky Mountains. This region is not yet well studied owing to its having been long set apart as a home for various tribes of Indians when they were removed from their original homes. It is followed on the south-west by the *Llano Estacado*, an even-topped plateau in northern Texas, confluent with the Great Plains in the north-west, gnawed on the north-east, east, and south by the head waters of many rivers that flow to the Mississippi and the Gulf, and divided from the mountains on the west by the valley of Pecos river. As a source of

sediment for fertile flood plains in a moister climate near the coast, the Llano is well placed ; but its upland surface is too arid for profitable occupation, unless by wandering herds, and for these the scarcity of water is a formidable difficulty. In summer the plateau is intensely hot by day, and it is probably from this region and its fellows beyond the Mexican boundary that the "hot-winds" of Kansas and Nebraska are derived. These south-west winds are veritable scourges, for with a temperature of 95° or more and an extremely low humidity, they blight the fields over which they pass. They frequently affect narrow belts in the direction of their progress, as if their excessive heat was limited to a small current in the general movement of the winds. Fortunately they are of rare occurrence in their greater severity. It has been suggested that, like similar winds observed in northern India, the high temperature of these fiery blasts is immediately derived from compression during their descent from a considerable altitude ; but it is manifest that they must have been previously heated when near the ground.

Denver is the only important city on the Great Plains. Thirty years ago it was reached only by stage-coach ; now it is the focus of many railroads, some coming from the Mississippi valley, others entering the Rocky Mountains which rise a dozen miles away. There was originally nothing in the immediate surroundings of Denver to give it eminence over a score of other frontier settlements. It is built on Cherry Creek, which, like many another stream in the dry country, is a bed of sand and gravel during much of the year, but which occasionally rises in furious floods from cloud-burst rains. The neighbouring plains for a hundred miles are occupied partly as cattle ranges, partly as irrigated farms. The mountains beyond have mining towns here and there. The successful growth of Denver depends partly on the long distance by which the Rocky Mountains are separated from the cities of the Mississippi valley, partly on the contrast between the Plains and the Mountains ; for even in the days of railroads, centres of trade must not be too far from their constituents.

THE ROCKY MOUNTAINS

The Rocky Mountains.—The Great Plains are terminated abruptly on the west by the front range of the Rocky Mountains, which rises from a base of 4,000 or 6,000 feet to summits of 10,000 or 14,000 feet. Many other ranges of similar height follow further west ; each has its local name, as the Teton Range in Wyoming, south of the Yellowstone Park, one of the grandest mountain groups in the west ; the Sawatch Range beyond the upper waters of the Arkansas in Colorado, with its chief peaks, Harvard, Yale, and Princeton, named after eastern colleges ; the Uinta Range in Utah, exceptional in having an east and west trend nearly at right angles to its fellows ; the Wahsatch Range in Utah, overlooking the arid basin of Great Salt Lake on the west. Although often of bold and vigorous

form, "needles" and "horns" are comparatively rare. Talus-covered flanks of uniform slope are extensively developed. The upper slopes stand high above the tree line, yet they gather only small snowfields and bear no glaciers except in northern Montana. The moraines of extinct glaciers are, however, abundant in many valleys. The middle and lower slopes are generally forested, except in the far south.

Geology of the Rocky Mountains.—The geological series in the mountain ranges extends from the ancient crystalline rocks through the Palæozoic and the Mesozoic to the early Tertiaries. Well-defined Devonian horizons usually have small thickness. The Carboniferous is a heavy marine limestone with no trace of coal. Workable beds of coal, chiefly lignite, occur in the upper Cretaceous and lower Tertiary. The long maintained conformability of the rock series, sometimes without a break from Cambrian to Cretaceous, gives an interesting contradiction to the early doctrine that a great break is always to be found between the Palæozoic and Mesozoic. The prevailing absence of metamorphosed sediments is a notable peculiarity. Igneous rocks are common in the form of intrusive sills and laccoliths, and in the Yellowstone region there are extrusive flows and agglomerates of great thickness and extent.

The structure of many ranges is anticlinal. The axis of the front range, south of the Missouri, is largely composed of granite, from which the bedded formations dip away with much regularity on either flank. The Uinta Range is still arched over by Carboniferous strata for much of its length. The Wahsatch is peculiar in being of synclinal structure, with an east to west axis at right angles to the range, and broken across by a great fracture that marks the eastern border of the Great Basin and exposes a vast natural section on the western slope of the mountains. North of the Missouri river, and extending into Canada, the front range also assumes a synclinal structure, with a great overthrust fault near its eastern base: here the lower Palæozoic formations are extremely heavy, while further south, where the anticlinal structure prevails, they are comparatively thin. Massive laccoliths form the resistant centres of some mountain groups in western Colorado; they are greatly denuded and elaborately carved, forming some of the most picturesque scenery of the region.

On passing from the modern, undisturbed strata of the Great Plains to the ancient, disordered structures of the Rocky Mountains, the pastoral industries of the one region give place to the mining industries of the other. Important deposits of gold, silver and copper have been profitably worked at *Cripple Creek*, *Leadville* and *Butte*; hundreds of less valuable deposits have led to moderate returns or to unknown losses; countless "prospects" have been tested by pick and shovel in all parts of the mountains, high and low. Modern methods of drilling rocks and treating ore are so rapid that already many mining districts are nearly or quite worked out; their excitable population, with the feverish accompaniments of saloons and gambling houses, have moved away to some

newer "camp." In spite of the scant half century of exploitation, deserted villages are no rarities.

Intermont Basins.—Many basins are found among the mountains, where broad surfaces of moderate relief attract the ranchman to raise cattle and wheat. Here railroads make their way between the ranges, and permanent settlements spring up. To this steadier class of population, as well as to the speculative and excitable miner, the future welfare of the region will be due. The basins are in all cases due to a deformation or warping of the mountain structure; they serve as gathering grounds for the rock-waste swept down from many centripetal valleys: deposits of gravel and sand a thousand feet or more thick having been formed in this way. The outflowing river of each basin escapes through the enclosing range in a gorge or canyon, usually so narrow and steep-sided as to be useless for roads, and passable only with great difficulty by railroads. In many cases the river has worn its canyon so deep that the floor of the basin is now dissected into bench land and flood plain: the latter is irrigable and serves for wheat land, the former is dry and serves only for pasture. In some cases the strata of the older basins, tilted by later disturbances and now more or less denuded, form low ridges lateral to the ranges that once supplied their sediments.

The intermont basins present at first sight every appearance of having been formerly occupied by lakes. In some cases the appearance is confirmed by the occurrence of fine silts appropriate to lacustrine conditions of deposition; but it often happens that layers of coarse texture and irregular stratification form a large part of the basin deposits, and hence it must be concluded that in such cases the warping of the basin did not proceed much faster than the filling of its floor and the cutting of its outlet, and that the deposits are fluvial and not lacustrine. This conclusion is particularly fitting for those basins in which the floor is not level, but inclines from the margins to the river of discharge, after the fashion of piedmont slopes of mountain waste, the world over. Even if lakes were formed at brief times of more rapid warping, their depth was probably small and their duration short.

The San Luis Valley, an oval depression about sixty miles long, between two ranges in southern Colorado and northern New Mexico, is a good example of an intermont basin. The surface round the margin has a gentle slope towards the centre, and here the deposits are stony and gravelly; here the streams run out from the mountains in good volume. The central area is "as flat as a billiard table"; here the materials are sands and silts, and here the smaller streams wither away in the dry air. The stronger streams unite to form the Rio Grande, which makes its exit southward by a dark gorge through the mountains. Here, as in New Mexico generally, there are many traces of Mexican occupation in names and people. The Big Horn Basin, enclosed by a range and drained by a river of the same name in Wyoming, once resembled the

San Luis Valley in having a smooth floor, but now it is dissected to a depth of two or three hundred feet by the centripetal and the exit streams. The Green River Basin, in western Wyoming, drained by the Green river in a deep canyon through the Uinta Range, is now dissected so as to convert its once even floor into a labyrinth of bad lands, with local reliefs up to a thousand feet. The "Parks" that occur west of the front range in Colorado are intermont basins of greater height than usual—6,000 or 7,000 feet—with rainfall enough to support here and there a park-like growth of pine trees.

The Yellowstone Park.—An extensive intermont basin in north-western Wyoming has a plateau-like surface, built up by heavy lava beds; the numerous geysers which occur in it have led to the reservation of the region as the Yellowstone National Park. There are picturesque mountains bordering the basin; a few dissected volcanoes, like Mount Washburn, surmount the lava beds; but as a whole the scenery is relatively monotonous. The broad plateau is clothed with a pine forest through which the stage roads wind from one group of geysers to another. The geysers are associated with hot springs, around which siliceous deposits of great beauty have been formed. Yellowstone lake and Yellowstone canyon are grateful variations from the sameness of the forested lava plateau. This "park," which is nearly as large as Yorkshire, will always be preserved in a state of nature and serve as a refuge for native animals.

The Colorado Plateaux.—South of the Uinta Range in Utah, New Mexico, and Arizona, there is an extensive region of great altitude (over 6,000 feet) that is traversed by the Colorado river and its few branches in deep canyons. A heavy series of Palæozoic and Mesozoic strata, lying nearly horizontal, has been greatly denuded, so that the stronger layers now form great platforms ending in rugged cliffs and escarpments, while the weaker layers are worn back until they are hidden under the talus of the cliffs. In the north-western part of this area, great fractures divide the country into blocks, ten or twenty miles wide; and the adjacent blocks are moved unevenly, so that the edges of the higher blocks, now more or less battered by the weather, form cliffs one or two thousand feet high. Volcanic action has been plentiful. The deep-seated intrusions of cistern-like form, known as laccoliths, were first recognised in the Henry Mountains, a group of rugged forms in a greatly denuded region west of the Colorado river. Lofty volcanic cones, like San Francisco mountain, and extensive lava flows are scattered about near the Colorado canyon; some of the former are more or less dissected by radial valleys, others are symmetrical cinder cones hardly affected by erosion; some of the latter form mesas surmounting a more denuded surface, others are of modern date, still black and unweathered, occasionally forming stony cascades over the fault cliffs. This volcanic centre constitutes a striking exception to the rule that volcanic action is limited to continental margins and to the ocean floors. It is owing to a comparatively recent uplift of this denuded

region, after the cliffed platforms had been carved, that the larger rivers have incised their extraordinary canyons, 3,000 to 5,000 feet in depth.

The highest plateaux receive sufficient rainfall to be forested; the less lofty uplands are barren deserts, unattractive to the ranchman or the miner, however wonderful to the geographer and geologist. Where the plateaux have been most vigorously dissected into a labyrinth of branching spurs, a few tribes of warlike Indians still remain unsubdued. Where isolated mesas offer natural protection, several tribes of gentler nature have made their homes. Shallow caves under overhanging cliffs contain the abandoned stone dwellings of a people who probably chose these singular sites for the safety that they gave from attack. A few settlers are found in valleys or basins where water can be had to irrigate their fields. Some lumbermen have attacked the forests on certain of the volcanoes near a railroad line that crosses the desolate plateaux. Government surveyors have traversed and studied the region, and it would almost seem that the greatest gain to be derived from this almost uninhabitable country will be its teachings as to the origin of land-forms by wholesale denudation.

The Columbia Plateaux.—A great extent of country drained by the Columbia and Snake rivers in Idaho, Oregon, and Washington, is built up of vast lava sheets, which have converted a broad depression between the Rocky and the Cascade Mountains into an extensive plateau. The shore line of the lava flood may often be traced, entering the mountain valleys in level embayments, indented by the mountain spurs which advance into it like promontories. Isolated hills and mountains occasionally rise above the lava plain like outlying islands. The lava floods must have taken place at different dates; for while some are smooth, unweathered, and barren, as if very recent, others are more or less upheaved and dislocated, and dissected even by small streams. The Blue Mountains in south-eastern Washington are only an uplifted and deeply dissected part of the lava plateau; here the canyon of Snake River has a depth of 4,000 feet with intricately carved walls. At certain points the stream has laid bare some of the underlying mountains; one of these, composed of resistant quartzite, is cut down 2,500 feet by the river, although capped by 1,500 feet of bedded lavas. Elsewhere the dissection is of gentler nature; from every interstream swell of the surface a vast expanse of treeless undulations stretches away to a horizon almost as level as that of the sea. Gray sage brush is found everywhere; scattered tufts of grass suffice for ranging horses and cattle. Near the Rocky Mountains, where the rainfall is somewhat greater than over the centre of the plateau, there is a plentiful soil on the uplands, partly supplied by local weathering, partly wind-borne from further west; here is one of the newer wheat districts of the great interior country. Although the land is not at first sight inviting to the farmer, it repays his labour abundantly without the need of irrigation. *Spokane*, where two transcontinental railway lines come together, is the growing metropolis of this region.

One of the most remarkable features of the lava plateau is the former path of the Columbia river, known as the "Grand Coulée," carved when its northern détour was obstructed by ice streams that descended from the mountains on the north and west in the glacial period. Although now nearly dry, the Grand Coulée may be traced for over a hundred miles across the plateau; here narrow and deep-cut in the uplifted lava beds, there broader and shallower in a lower upland; generally with an even floor, but at one place broken by the cliffs of a former cataract that must have greatly exceeded Niagara in height, breadth and variety of form. The pools that were excavated by the plunge of the extinct cataract contain clear blue lakes, but the cliffs are dry and bare.

The Basin Ranges.—West of the Wahsatch Range and the Colorado plateaux, south of the Columbia plateaux, and east and south of the Sierra Nevada, there is an arid region embracing all of Nevada, part of Utah and Arizona and the south-eastern corner of California, and extending into Mexico. Only one important river, the Colorado, reaches the sea from this desert empire. Nearly all the scanty rainfall dries away in the dessicating atmosphere. The region is diversified by many independent mountain ranges of north and south trend and of varied structure. Some bear trees on their upper slopes; others are barren to their crests. In the north-west, adjoining the lava plains of Oregon, some of the ridges are notable for the very recent date of their uplift, their form being as yet hardly modified by erosion from the original shape of their tilted blocks. In the middle of the region the ridges are elaborately carved by valleys and branch valleys. In the south-west some of the ridges appear to be nearly worn away, only low residual knobs remaining.

The confluent depressions between the isolated ranges are floored with long piedmont slopes of stony and gravelly waste that has been washed from the mountain valleys. Two approaching slopes unite in forming an intermont trough whose floor may stand at altitudes of 4,000 or 6,000 feet in Utah and northern Nevada, thus rivalling the height of many plateaux; yet it differs from a typical plateau in the prevailing absence of valleys, for the waste slopes are built up by the streams that issue heavily charged with detritus from the mountain gorges. Thus the depressions are filling up while the mountains are wearing down. In the south-west the floor of the depressions is of moderate altitude; indeed, in south-eastern California the arid floor of the Coahuila desert descends 300 feet beneath sea-level. This depression represents the head of the Gulf of California, now isolated by the delta of the Colorado and evaporated to dryness. An outflowing branch or tributary of the Colorado occasionally turns northwards on the delta at times of high water, and flows into the desert basin, forming a short-lived lake. In south-western Arizona some of the gently inclined piedmont slopes are rock-floored, bearing only a thin veneer of waste here and there; the streams, issuing from the mountains after a shower, find no channels, but spread out in a sheet a mile or more broad and one or

two feet deep, washing the gravel veneers forward down the inclined rock floor; this peculiar style of drainage has been termed a "sheet flood."

Nearly all the streams from the mountains wither away on the dreary piedmont waste slopes. Sage brush is the prevailing vegetation; spiny yuccas and thorny cactus occur in the arid and warm south-west. The larger streams unite to form shallow salt lakes in the lowest part of the intermont troughs. Others form shallow water sheets, a few inches deep, in the wet season, where smooth plains of barren sun-baked mud, or "playas," remain in the dry months. There are few parts of the country less inviting to settlement than the region of the Basin Ranges, yet here, as on the Colorado plateaux, the scientific explorer has reaped a rich harvest. Comparable with the record of a past glacial climate in the region of the Laurentian lakes is the record of a past humid climate in the arid basins of Utah and Nevada. The basin of Great Salt Lake in Utah

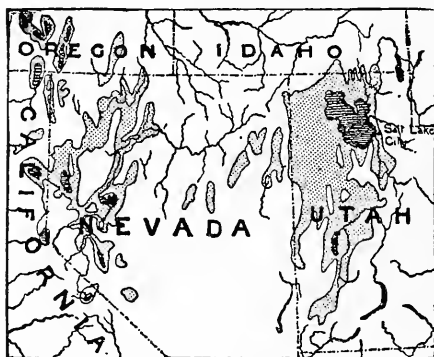


FIG. 366.—The Ancient Beds of Lake Bonneville (in Utah) and Lake Lahontan (in Nevada). The Map measures 550 by 420 miles.

and that of several independent lakes in north-western Nevada each formerly held large lakes that rose nearly a thousand feet on the adjoining mountain flanks, and there marked their shore lines in cliffs, bars and deltas. The records have been deciphered and are elaborately described in monographs of the United States Geological Survey. No other ancient lake basins have been so well studied.

People and Towns of the Basin Ranges.—

The settlements of the Basin Range region may be grouped under three classes: the Mormons originally about Salt Lake in Utah, the mining towns in the mountains, and scattered ranches of Mormons and Gentiles, where streams can be used for irrigation. The Mormons exhibit in their polygamous and superstitious creed an example of religious atavism. Their converts have been gathered from the eastern United States and from western Europe. Their history includes many deeds of violence and cruelty, yet much may be said in their favour. Their settlements in Utah were established half a century ago without the intemperance of every kind that has characterised the frontier towns of those who would in a census be classed as "Christians." Their desert home has been transformed into a productive farming country by persevering industry and thrift. Polygamy, now formally abandoned, was never practised by more than 4 per cent. of the marriageable men; the Mormons should be classed as merely one more of the

many superstitious sects of the so-called civilised nations. *Salt Lake City* on the shore of the lake is the centre of Mormon activity.

The most famous mining town of the Basin Ranges is *Virginia City* in north-western Nevada. Many millions of gold and silver have been taken from the Comstock Lode, above which the city was built, and many other millions have been spent in efforts to prolong the life of the mines there opened. The discovery of the lode about 1860, at a time when the yield of gold in California was decreasing, caused the greatest "rush" known in the history of western mining. Thousands of persons hurried over the Sierra Nevada, in the hope of locating a paying claim; other thousands followed to open saloons, gambling resorts, and "opera houses," and thus, like parasites, to live upon the miners. The rapid growth of *Virginia City* and a few other mining "camps" was the excuse for the admission of Nevada as a State in 1864; a most unfortunate political necessity, for in spite of its enormous area, exceeding that of many eastern States combined, its population has fallen under 50,000, less than that of many cities of the second class. *Virginia City* is now reduced to a mere shadow of its short-lived greatness. The population of the State must always be scanty, scattered, and isolated.

THE PACIFIC SLOPE

The Pacific Ranges, broadly separated from the Rocky Mountains, include the lofty Sierra Nevada of California, the Cascade Mountains of Oregon and Washington, and several smaller coast ranges. The highest summits are in the granitic southern part of the Sierra Nevada, where Mount Whitney nearly reaches 15,000 feet. The Sierra is precipitous on the east, descending abruptly into the Basin Range region and shedding great slopes of stony waste, varied about Mono lake by superb moraines of extinct glaciers. The descent on the west is much more gradual; here many of the interstream highlands have the appearance of somewhat uneven inclined planes, separated by deep-cut canyons. All these features suggest that the range as a whole may be regarded as a huge block, uplifted on the east long enough ago to be deeply scored by the streams from its crest. Among the valleys the Yo-Semite is phenomenally deep, with precipitous walls of granite. The Hetch-hetchy valley is of similar form, but of smaller dimensions, a little further north. The range is crossed only by Pitt river, which rises on the western part of the Columbia plateau, trenches through the range and joins the Sacramento system. Great flows of lava and sheets of volcanic conglomerates lie on the western slope of the range about its middle, the date of their eruption being earlier than that of the valley cutting. Further north volcanic cones and recent lava flows become more abundant.

The higher summits of the Cascade Range are all volcanic cones, more or less dissected by radiating valleys, the chief being Mounts Rainier, St. Helens, and Hood. They bear heavy snowfields and glaciers. Mount

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Shasta, in northern California, is an isolated volcano, west of the higher ranges, one of the most symmetrical and least dissected of the larger cones. Crater lake in southern Oregon occupies a huge caldera ; once a lofty cone, furrowed by radial valleys, the upper part has been removed by engulfment, leaving a great cavity, with precipitous inner walls, four miles in diameter and one mile deep. The lost summit of the cone has been christened Mount Mazama by a club of mountain climbers of that name, who have done much to make the caldera better known. The Columbia and Klamath rivers break through the mountains in deep gorges on their way from the lava plateaux to the sea.

The Coast Ranges are of moderate altitude, well dissected by numerous valleys, and frequently descending directly to the ocean shore in precipitous cliffs and headlands. Many signs of change of level are found in raised beaches and submerged valleys ; but owing to the general parallelism of the ridges and the coast line, and to the absence of recent strong depression, the shore has few strong re-entrants. The range is not rich in metalliferous deposits, save at *New Almaden*, where there has been a large yield of mercury.

The broad troughs between the Coast Ranges and the higher mountains further inland are floored with waste from the mountain valleys. In California the waste-strewn floor makes a plain of great extent, the flat fans of detritus that are spread out before every mountain valley being admirably adapted to the distribution of water by irrigating canals. The intermont trough is much less distinctly developed on the path of the Klamath river, where the adjacent ranges approach one another in a node of irregular relief. Further north it reappears, and is partly occupied by the branching waters of Puget Sound. Here recent studies lead to the conclusion that the waste-built lowlands adjoining the sound are glacial or aqueo-glacial deposits, while the trunk and branches of the sound are the spaces once occupied by many confluent ice streams that came down from the mountains in the glacial period. The many degrees of latitude that are traversed in passing along the Pacific slope from the desert lowlands between the Basin Ranges of south-eastern California over the great valley of California to the forested valley of Puget Sound, explain the climatic contrasts between the arid and humid extremes of this belt. They resemble each other only in their relatively small seasonal changes, one being persistently warm and dry, the other persistently cool and wet.

People and Towns of the Pacific Coast.—The settlement of the Valley of California by Spanish Americans was well advanced before the discovery of gold caused the inrush of fortune-seekers from the eastern United States and Europe in 1849 and 1850. Spanish names still preponderate, as in *Sacramento*, the capital, *San Francisco*, the great Pacific port at the only break in the California coast range, *Los Angeles* and *San Diego* on the coast further south. The old Spanish mission churches are the only antiquities of the State having European associations. In those early days

cattle raising on the great valley plain was the main industry, and hides were the chief article of export. With the acquisition of the territory by the United States and the incursion of gold seekers, a new order of things was inaugurated; a rough and violent order at first when "vigilance committees" put their prompt measures in the place of the slower procedure of the law courts.

The newcomers made their way thither by long voyages in sailing ships round Cape Horn, by shorter voyages with a land passage across the malarial isthmus of Darien, and by a difficult and dangerous overland journey in white-covered waggons or "prairie-schooners." The hardships of the overland passage across plains, mountains, and desert basins, are long to be remembered; Indian ambuscade, thirst in the dry country, and cold storms in the Sierra overcame many a pioneer emigrant. The survivors are justly proud of their record as "'49-ers." Gold was taken from quartz veins in the metamorphic rocks of the lower Sierras, and from "placers" or gravel deposits in the

foot hills; but in the ten years from 1850 to 1860 the great increase of population and the exhaustion of many mines and "diggings" turned attention to the fertility of the great valley plain, the cattle ranches were replaced by farms, and California became a great wheat-raising State. The second decade was marked by the construction of a trans-continental railroad, completed in 1866, and California then ceased to be a distant part of the Union. In later years the number of railroads



FIG. 367.—The Site of San Francisco.

across the continent (Fig. 336) has increased to five—not counting the Canadian Pacific Railway—each line now being largely dependent on carrying cattle and farm products by the way, as well as on through passengers and freights. Beautiful winter resorts attract thousands of people to the tempered Pacific coast from the violent climate of the interior. The irrigated plains of southern California are now occupied by extensive vineyards and fruit ranches, from which eastern markets are largely supplied. At the same time the more northern railroads have promoted the growth of *Portland*, *Tacoma*, and *Seattle* on the harbours of the far north-west; the great forests on the littoral slopes of Oregon and Washington are being sawed into lumber for the distant plains and prairies. The purchase of Alaska and more recently the discovery of the Klondike gold-field, has encouraged traffic along the north-western coast. Trans-Pacific commerce has in the meantime grown apace, and with it came an incursion of Chinamen, patient and industrious workers, living on

a fraction of what would be required for an ambitious American, not making the United States their home, but hoping to return to China alive or dead ; a useful element in a country where serfdom prevailed, but not desirable citizens for a free republic. The manifest lesson to be drawn from the great intelligence and prosperity of the people in the north-eastern quarter of the United States is that all immigrants must make this country a permanent home for themselves and their children ; that they must accept the rights and duties of citizenship as well as the responsibility of self-support and self-improvement ; and that from the unified mass thus formed no barrier of race, religion or foreign fealty shall obstruct the rise of leaders, to guide the people in the further development of the United States.

Alaska.—The north-western extremity of North America, constituting the territory of Alaska, 580,000 square miles in area (about one-sixth of the area of United States) was bought from Russia for \$7,200,000 in 1867. It has a small native population of various Indian tribes, and a growing white population bent on the development of its resources. The compact land body, approaching within 54 miles of Asia, and bounded on the east by the 141st meridian, has an arm 500 miles long extending south-east along the coast, and including a narrow strip of mainland as well as the countless islands of the Alexander Archipelago. *Sitka*, the territorial capital, is situated on Baranof Island in this group. There is a second arm, 1,500 miles in length, composed of the volcanic Aleutian Islands, looping across the northern Pacific from Alaska Peninsula towards Kamchatka. The coast line is extremely irregular on the south, measuring in total 18,000 miles, or more than that of all the United States.

The southern coast is bold and mountainous. Mount St. Elias, practically on the frontier at the base of the south-eastern arm, rises higher than 18,000 feet. The heavy snowfall forms immense glaciers, descending to the sea, the largest being the Malaspina glacier, fed by snow-fields on the St. Elias range. Muir glacier, further south-east, is annually visited by many tourists. The temperature on the mountain flanks is moderate and equable, favouring the growth of heavy forests along the coast as far as Kadiac Island, at the base of the Aleutian chain. The interior is little known, except along the course of the Yukon, one of the great rivers of the world. Its climate is drier than on the coast, and the seasonal changes of temperature are greater ; extreme cold is felt in winter, and the ground is frozen to a depth estimated at 100 feet. Here the vegetation is chiefly a dense cover of moss. On the north coast, far within the Arctic circle, layers of ice are seen beneath the surface soil.

The economic products of Alaska come at present chiefly from the seal fisheries of the Pribilof Islands (north of the Aleutian chain), and from the gold-fields of the Yukon valley and the coast of Bering Sea. The seals have been reduced from their originally countless numbers by too reckless destruction, but if their capture is properly restricted they must

yield a large revenue to the Government as well as a profit to the sealers for many years to come. Gold deposits of moderate value have been worked for about thirty years past at various points on the Alexander Archipelago. In the autumn of 1896 the Klondike field in the Canadian Yukon District was discovered, and when the news of its richness reached the United States in the following spring, there was a "rush" of would-be miners that recalls early Californian days.

Alaska is of especial interest as the first outlying territorial addition to the United States. Its purchase provoked much criticism, and even ridicule, yet as a financial investment it has been profitable. Its administration has been thus far comparatively simple, for its population has been far too small for any question to arise as to its accession to Statehood. Quite different political problems must arise in the more populous detached territories in a genial climate which have recently been brought under the sway of the United States.

STATISTICS.

AREA AND POPULATION OF THE UNITED STATES.

	Area. sq. miles.	Population.			Date of Admission.	
		1880.	1890.	1900.	Territory.	State.
Alabama.. ..	52,250	1,262,505	1,513,017	1,828,697	1817	1819 Ala.
Arizona	113,020	40,440	59,620	122,931	1863	— Ariz.
Arkansas	53,850	802,525	1,128,179	1,311,504	1819	1836 Ark.
California	158,360	864,094	1,208,130	1,485,053	—	1850 Cal.
Colorado	103,925	194,327	412,198	539,700	1861	1876 Col.
Connecticut	4,990	622,700	746,258	908,420	Original State.	Conn.
Delaware	2,360	146,608	168,493	184,735	—	Del.
District of Columbia	70	117,624	230,392	278,718	1791	— D. C.
Florida	58,680	269,493	391,422	528,542	1822	1845 Fla.
Georgia	59,475	1,542,180	1,837,353	2,216,331	Original State.	Ga.
Idaho	81,800	32,610	84,385	161,772	1863	1890 Id.
Illinois	56,650	3,077,871	3,826,351	4,821,550	1809	1818 Ill.
Indiana	36,350	1,978,301	2,192,404	2,516,402	1800	1816 Ind.
Indian Territory	31,400	—	392,060	—	—	I. T.
Iowa	56,025	1,624,615	1,911,896	2,231,853	1838	1845 Iowa.
Kansas	82,080	900,096	1,427,096	1,479,495	1854	1861 Kans.
Kentucky	40,400	1,648,690	1,858,635	2,147,174	—	1792 Ky.
Louisiana	48,720	939,946	1,118,587	1,381,625	1805	1812 La.
Maine	33,040	648,936	661,086	604,466	—	1820 Me.
Maryland	12,210	934,943	1,042,390	1,188,044	Original State.	Md.
Massachusetts	8,315	1,783,085	2,238,943	2,805,346	—	Mass.
Michigan	58,915	1,636,937	2,093,889	2,420,982	1805	1837 Mich.
Minnesota	83,365	780,773	1,301,826	1,751,394	1849	1858 Minn.
Mississippi	46,810	1,131,597	1,280,600	1,551,270	1798	1817 Miss.
Missouri	69,415	2,168,380	2,679,184	3,106,665	1812	1821 Mo.
Montana	146,080	39,159	132,150	243,329	1864	1889 Mont.
Nebraska	77,510	452,402	1,058,910	1,066,300	1854	1867 Neb.
Nevada	110,700	62,266	45,761 ¹	42,335	1861	1864 Nev.
New Hampshire	9,305	346,991	376,530	411,588	Original State.	N. H.
New Jersey	8,175	1,131,116	1,444,933	1,883,609	—	N. J.
New Mexico	122,580	119,565	153,939	195,310	1850	— N. M.
New York	49,220	5,082,871	5,997,853	7,268,894	Original State.	N. Y.
North Carolina	52,250	1,399,750	1,617,947	1,893,810	—	N. C.
North Dakota	70,795	135,177 ²	182,719	319,146	1861	1889 N. Dak.
Ohio	41,000	3,198,062	3,672,316	4,157,545	—	1802 O.
Oklahoma	39,030	—	61,834	398,331	1890	— Ok. T.
Oregon	96,030	174,768	313,767	413,536	1848	1859 Ore.
Pennsylvania	45,215	4,282,891	5,258,014	6,302,115	Original State.	Pa.
Rhode Island	1,250	276,531	345,506	428,556	—	R. I.
South Carolina	30,570	995,577	1,151,149	1,340,316	—	S. C.

¹ Decrease.² Including South Dakota.

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AREA AND POPULATION OF THE UNITED STATES—(continued).

	Area. sq. miles.	1880.	1890.	1900.	Date of Admission. Territory.	State.
South Dakota ..	77,650	See N. Dakota.	328,808	401,570	1861	1889 S. Dak
Tennessee ..	42,050	1,542,359	1,707,518	2,020,616	—	1796 Tenn.
Texas ..	265,780	1,501,749	2,235,523	3,048,710	—	1845 Tex.
Utah ..	84,970	143,963	207,905	276,749	1850	1896 U.
Vermont..	9,565	332,286	332,422	343,641	—	1791 Vt
Virginia ..	42,450	1,512,565	1,655,980	1,854,184	—	Original State. Va.
Washington ..	69,180	75,116	349,390	518,103	1853	1889 Wash.
West Virginia ..	24,780	618,457	762,794	958,800	—	1863 W. Va.
Wisconsin ..	56,040	1,315,497	1,686,880	2,069,042	1836	1848 Wis.
Wyoming ..	97,890	20,789	60,705	92,531	1868	1890 Wy.
United States ..	3,022,600	50,155,783	62,622,250	76,085,794		

POPULATION BY BIRTH.

	1890.	1900.	
England ..	909,092	842,078	
Wales..	100,079	93,682	
Scotland ..	242,231	233,977	
Ireland ..	1,871,509	1,618,567	
United Kingdom ..	3,122,911	2,788,304	
Germany ..	2,784,894	2,660,990	
Canada and Newfoundland ..	980,938	1,181,255	
Sweden and Norway ..	800,706	910,025	
Russia and Poland ..	339,084	807,606	
Italy ..	—	484,207	
Austria-Hungary ..	303,812	579,042	
China ..	106,688	81,827	
Other Foreign Countries ..	819,514	857,388	
Total Foreign Born ..	9,249,547	10,356,644	
Coloured, Native Born ..	7,470,040	8,840,388	
White, Native Born ..	45,902,663	57,888,762	

Total Population of United States (excluding Alaska) 62,622,250

77,085,794

POPULATION OF THE LARGER CITIES OF THE UNITED STATES.

	1890.	1900.		1890.	1900.
New York, N.Y. ..	1,515,301	3,437,201 ¹	Worcester, Mass. ..	84,655	118,421
Chicago, Ill. ..	1,099,850	1,698,575	Syracuse, N.Y. ..	88,143	108,374
Philadelphia, Pa. ..	1,046,964	1,293,697	New Haven, Conn. ..	81,298	108,027
Brooklyn, N.Y. ..	806,343	—	Paterson, N.J. ..	78,347	105,171
St. Louis, Mo. ..	451,770	575,238	Fall River, Mass. ..	74,398	104,863
Boston, Mass. ..	448,477	560,802	St. Joseph, Mo. ..	52,324	102,979
Baltimore, Md. ..	434,439	508,957	Omaha, Neb. ..	149,452	102,555
Cleveland, O. ..	261,353	381,768	Los Angeles, Cal. ..	50,395	102,479
Buffalo, N.Y. ..	255,669	352,387	Memphis, Tenn. ..	64,495	102,320
San Francisco, Cal. ..	298,997	342,782	Scranton, Pa. ..	75,215	102,026
Cincinnati, O. ..	296,908	325,902	Lowell, Mass. ..	77,696	94,969
Pittsburg, Pa. ..	238,617	321,616	Albany, N.Y. ..	94,923	94,151
New Orleans, La. ..	242,039	287,104	Cambridge, Mass. ..	70,028	91,886
Detroit, Mich. ..	205,876	285,704	Portland, Ore. ..	46,385	90,426
Milwaukee, Wis. ..	204,468	285,315	Atlanta, Ga. ..	65,533	89,872
Washington, D.C. ..	230,392	278,718	Grand Rapids, Mich. ..	60,278	87,565
Newark, N.J. ..	181,830	246,070	Dayton, O. ..	61,220	85,333
Jersey City, N.J. ..	163,003	206,433	Richmond, Va. ..	81,388	85,050
Louisville, Ky. ..	161,129	204,731	Nashville, Tenn. ..	76,168	80,865
Minneapolis, Minn. ..	164,738	202,718	Seattle, Wash. ..	42,837	80,671
Providence, R.I. ..	132,146	175,507	Hartford, Conn. ..	53,320	79,850
Indianapolis, Ind. ..	105,436	169,164	Reading, Pa. ..	58,661	78,961
Kansas City, Mo. ..	132,716	163,752	Wilmington, Del. ..	81,431	76,508
St. Paul, Minn. ..	133,156	163,005	Camden, N.J. ..	58,313	75,935
Rochester, N.Y. ..	133,896	162,608	Trenton, N.Y. ..	57,458	73,307
Denver, Col. ..	106,713	133,859	Bridgeport, Conn. ..	48,806	70,996
Toledo, O. ..	81,434	131,822	Lynn, Mass. ..	55,727	68,513
Allegheny, Pa. ..	105,287	129,896	Lawrence, Mass. ..	44,654	62,559
Columbus, O. ..	88,150	125,560	Des Moines, Iowa ..	50,093	62,139

LAND UNDER CROPS IN 1901.

Crop ..	Indian Corn.	Wheat.	Oats.	Cotton.	Barley.	Potatoes. ²
Acres ..	91,350,000	49,896,000	28,541,000	27,532,000	4,296,000	2,611,000

¹ Includes Brooklyn.

² In 1900.

CHIEF WHEAT-GROWING STATES, 1901.

State	Kansas.	Minnesota.	N. Dakota.	S. Dakota.	Nebraska.	United States.
Million bushels ..	99'1	80'1	59'3	51'7	42'0	748'5

CHIEF COTTON-GROWING STATES, 1899.

State	Texas.	Georgia.	Mississippi.	Alabama.	S. Carolina.	United States.
Bales of Raw Cotton	2,438,000	1,346,000	1,204,000	1,005,000	831,000	9,143,000

CHIEF MINERAL PRODUCTIONS IN 1901.

Product	Bituminous Coal. ¹	Anthracite.	Pig Iron.	Gold.	Silver.
Amount—tons ..	201,630,000	60,242,000	15,878,000 ²	—	—
Value—£	47,300,000	22,500,000	48,400,000	15,730,000	14,270,000

GROWTH OF RAILWAYS IN THE UNITED STATES.

Date	1830.	1850.	1870.	1890.	1900.
Miles open	23	9,021	52,922	169,998	194,334

ANNUAL TRADE OF UNITED STATES (*in pounds sterling*).

	1871-75.	1881-85.	1891-95.
Imports	115,600,000	133,400,000	157,000,000
Exports	97,200,000	154,900,000	174,500,000

DESTINATION AND ORIGIN OF FOREIGN TRADE.

(Percentage of total in 1896.)

Country.	Exports to.	Imports from.	Total Trade.
United Kingdom	46'3	23'1	36'4
Germany	12'1	14'5	13'1
France	5'4	8'0	6'8
British North America	5'7	5'3	5'6
Brazil	1'2	9'0	4'4
Netherlands	4'8	1'7	3'5
Belgium	3'1	1'7	2'6
Italy	2'1	2'5	2'2
Mexico	2'2	2'3	2'2
Japan	1'3	3'1	2'1
China	1'2	2'6	1'8
Other Countries	14'6	25'3	19'3
Total	100'0	100'0	100'0

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¹ For development of coal production (Anthracite and Bituminous) see curve in Fig. 70.² In 1902 the production exceeded 17,800,000 tons.

CHAPTER XL.—MEXICO

BY ANGELO HEILPRIN,

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Position and Extent.—The Republic of Mexico (Spanish, *Méjico*), which bounds the United States on the south, lies between latitudes $32\frac{1}{2}^{\circ}$ and $14\frac{1}{2}^{\circ}$ N., and the meridians $86\frac{1}{2}^{\circ}$ and 117° W. of Greenwich. In its north and south extent it thus lies almost equally within and without the tropics. The boundary line with the United States, which was determined by treaties in 1848 and 1853, has a length of 1,833 miles, of which 1,136 are constituted by the Rio Grande, from the mouth of that stream in the Gulf of Mexico upwards. The boundary with Guatemala, which was finally adjusted by treaty in 1895, fixes the southern point of the republic almost at the mouth of the Zuchiate river. The area of the country, inclusive of a few small outlying islands, is some 767,000 square miles, or approximately three times that of Austria-Hungary. Mexico has two peninsular parts—the peninsula of Lower California (officially, *Baja California*) and Yucatan, the latter properly comprising the two States of Yucatan and Campeche. The great Gulf of California, which separates the main mass of the republic from Lower California and receives at its northern extremity the Colorado River from the United States, occupies seemingly the position of a sunken block of the Earth's crust which broke continuity between what is now the peninsular apex and the protruding coastline of the State of Jalisco.

Configuration.—Mexico is pre-eminently a region of mountain elevations, but this is not always to be recognised in the interior on account of the development of a broad elevated tableland whose flat or gently undulating surface, rising from the depression of the Rio Grande to graduated altitudes of 6,000, 7,000, and 8,000 feet, or even more, masks the configuration of the land. Much of this plateau has been formed through a progressive and long-continued accumulation of detrital material, representing in part the distributed products resulting from mountain destruction and in greater part the discharges from an almost endless number of volcanic openings. These have, as it were, filled the original valleys to their lips, and it is thus upon the new surface that the more recent or existing valleys have been imposed. In this conception, the great central plateau of Mexico is not of tectonic construction, but merely a filled-up series of troughs, not wholly unlike the snow-accumulated tableland of Greenland, through whose margins alone the buried moun-

tains protrude their summit-peaks. In Mexico, too, especially in the loftier parts of the plateau, buried mountains rear their summits as "islands" above the enveloping mass ; elsewhere they make continuous ridges or chains, whose crest-lines may be as much as 10,000 feet above the sea. The east and west flanks of the plateau clearly reveal their mountain origin, and in their sudden plunge to the lowlands the Sierra Madre Oriental and the Sierra Madre Occidental—as the two main lines of bulwarks and their ramifications are vaguely designated—present some of the most marked physical features, and at the same time some of the sublimest views of nature, that are to be met with on the Earth's surface. What relation the Mexican Cordilleras bear to the main Rocky Mountain system of North America has not yet been definitely determined, but that they do not constitute that integral part which was at one time assumed, is certain ; and it remains for further investigation to ascertain the relationship, if any such exists, with the South American Andes.

Volcanoes.—The volcanoes of Mexico are very numerous, and they constitute the highest relief of the land. The loftiest of these are : Citlaltepētēl, the “Star Mountain”—commonly known as the Peak of Orizaba—(18,250 feet), ranking, with the possible exception of Mount Logan, as the highest summit of the North American continent ; Popocatepētēl, the “Smoking Mountain” (17,520 feet) ; Ixtaccihuatl, the “White Woman” (16,960 feet) ; Nevado de Toluca (14,950 feet) ; Malinche (Matlalcueyatl, 13,460 feet) ; Cofre de Perote (Nauhcampatepētēl, 13,400 feet) ; Nevado de Colima (14,210 feet) ; Volcan de Colima (12,990 feet) ; Cerro de Apisco (12,700 feet) ; and Tancitaro (12,650 feet). The first two of these, both resting with one foot on the plateau, might properly be considered as dormant cones, since they continue to exhale from perfectly preserved craters aqueous and sulphurous vapours ; they are amongst the most beautifully formed of volcanic mountains. Ixtaccihuatl is manifestly a broken-down and dismantled volcano, having to-day the contour of some of the silenced volcanic peaks of the equatorial Andes, such as Antisana ; similar wrecks are the Nevado de Toluca (in whose crater is one of the most elevated lakes of the globe) and the Cofre de Perote. Colima is the most active volcano of the land, its eruptions having been almost unremitting for many years. Its position off the plateau, on the Pacific slope, allies it with Jorullo—a mountain of only Vesuvian proportions, made famous by Humboldt’s recital of its terrific constructive eruption of 1759–63. Heated columns of air, with a temperature of 167° F., still rise from the crater-walls of this forest-clad mountain. Some efforts have been made by geographers and geologists to prove that the principal volcanic cones are situated on one or more main lines of fissure which traverse the region in an extended east and west course ; and it has even been contended that the southern edge of the plateau was coincident with one of these lines, but this still remains to be demonstrated. The snow-line in the region of the higher summits being found but little below 15,000 feet, only three

of the peaks—Orizaba, Popocatepetl, and Ixtaccihuatl—are perpetually snow-clad, although the names of two other summits—Nevado de Toluca and Nevado de Colima—signify ice-mountain. The writer has seen the Nevado de Toluca entirely destitute of either snow or ice. Only on Ixtaccihuatl does the ice-cap acquire a development sufficient to form true glaciers.

Rivers and Lakes.—Mexico is singularly deficient in large permanent streams, and the Mexican rivers offer but little opportunity to navigation. Apart from the Rio Grande, which at times becomes almost dry between El Paso and Presidio del Norte in consequence of irrigation tappings in New Mexico, the most important waterways are the Rio Conchos in the north, the Rio Lerma, or Santiago, and Rio de las Balsas (Mescala)—both flowing to the Pacific—in the south, and the Grijalva and Usumacinta, in the State of Chiapas, east of the isthmus of Tehuantepec. About fifteen miles from the city of Guadalajara the Lerma is precipitated over the magnificent fall of Juanacatlan, the “Niagara of Mexico.” Nearly all parts of the country are gashed by deep troughs or excavated water-channels (*barrancas*), many of which are waterless during the dry season ; but, after the rains, are wild with the tumult of tumbling waters, to whose revivifying influence a luxurious vegetation responds.

There are no really large lakes in the republic, that of Chapala on the Lerma, in the state of Jalisco, being the largest ; but Cuitzeo and Patzcuaro,

in the State of Michoacan, are extremely picturesque. Six lacustrine basins, covering considerable area, but with very insignificant depth, occupy much of the valley of the City of Mexico, or the true plain of Anahuac, but their waters are merely relics of the much larger extent which they formerly occupied. At the time of the Spanish conquest, the City of Mexico was a city of islands, being completely surrounded by the waters of Lake Texcoco. At the time of Hum-



FIG. 368.—The Valley of Mexico.

boldt's visit the western borders of that lake occupied a position about one mile to the eastward of the city limits ; now, except in time of floods, this distance is about doubled. The depth of water in the lake at the present day, under normal conditions, hardly exceeds two feet over a large part of its area. The Mexican capital has at various times been inundated by the flooding of these lakes, and on account of the sewage of the city discharging into a lake without outlet epidemic malarial and gastric fevers have been common, and their ravages have only been checked by the benefits of a climate of 7,000 feet elevation. As it is, the death-rate

in the Mexican capital, 40 per 1,000, is the highest of any city in the civilised world. The problem of drainage has thus become so serious that the greatest drainage system and one of the most remarkable engineering enterprises in the world was commenced in 1866 and completed in 1898. This *desague*, as the work is called, comprises a canal forty-three miles in length and a tunnel somewhat exceeding six miles, the latter discharging into the valley of Tequixquiac, due north of Lake Zumpango.

Climate.—The tropical position of Mexico, combined with its high elevation, necessarily ensures to the land a variety of climatic conditions. What is ordinarily considered to be a stifling tropical temperature characterises the lowland region—at least, its southern half—for the greater part of the year, the maximum temperature at Mérida (Yucatan), Mazatlan, and Colima, not infrequently reaches 105° F. Ordinarily the summer heat is not more oppressive than in the southern or central United States, and along the immediate ocean border it is tempered by indraughts of cool sea-air. Over the greater part of the plateau-surface a mild temperate climate prevails, the temperature in summer rarely rising above 88° or 90°, or in winter falling much below the freezing point. Snow in the Mexican capital is an extreme rarity, but it is not absolutely unknown.

In a general way the Mexicans recognise three superimposed zones of climate : the hot zone, or *tierra caliente*, extending from sea-level to about 3,000 feet of elevation ; the temperate zone, *tierra templada*, between 3,000 and 5,000 feet ; and the cold zone, *tierra fria*, comprising the land above 7,000 feet. Manifestly this zonal distribution of climate, in a region whose meridional extent is upwards of 1,200 miles, differs considerably for the northern and southern sections of the country. Two well-marked seasonal conditions characterise much or most of the region. The rainy season, which occurs between May or June and October or November, brings joy to the landscape of Mexico, when the slumbering forces of vegetable and animal nature are again called into activity. During the height of the rainy season torrential rain falls almost daily, especially between the hours from two to four in the afternoon. In the dry season little or no rain falls. The highest rainfall appears to be at about Monterey, in the State of Nuevo Leon, where an annual average of about 130 inches has been established ; in the region about the City of Mexico, which represents the conditions of a large part of the plateau, the annual precipitation is about 25 inches. At Jalapa, situated (at an elevation of 4,400 feet) on the coastal slope of the Gulf of Mexico, the number of rainy days per year has been known to exceed 200. The conditions of rainfall throughout much of the land have unquestionably been greatly modified since the period of the Spanish conquest, as a result of extensive deforestation.

Flora and Fauna.—The Mexican flora naturally combines most diverse features. Dense and exuberant tropical jungles cover much of the low-lying tracts and the basal 2,000 to 3,000 feet of the mountain declivities. The forest is still in greater part virgin, and access to it

is obtained chiefly along the highways and the different waterways that irregularly thread through it. Among the dominant arboreal types of this tract may be mentioned the palms, figs (rubber-trees), *cæsalpinias*, and other acacias, the rosewood, and mahogany; the huge fig-trees are especially remarkable with their buttressed trunks. Hardly less imposing are the giant mangroves at various points on the coast of Yucatan. The zone between 4,500 and 6,000 feet, characterised by a superb growth of ever-green oaks, of melastomas, and in its lower part of an almost bewildering variety of orchidaceous plants, may be said to constitute the transition tract between the distinctively tropical and temperate floras; above, it is succeeded by the ordinary types of oaks and by the pine, spruce and fir among conifers. The latter ascend the high volcanoes to about 13,000 feet, forming magnificent forests at elevations of 9,000 to 10,000 feet. The "zones of vegetation," so called, can be made out with fair regularity, but the overlaps are remarkable for their vertical displacements. Thus, on the limestone ridges of the Yautepec, south of the central plateau, palms grow luxuriantly up to 7,500 feet; per contra, the pine is not infrequently met with down to an elevation of 3,000 feet or less. The most striking exhibitions of cactus growth—in which Mexico stands pre-eminent—are found on the lower plains of Yucatan and in the arboreal masses, which, at an elevation of some 6,000 feet, clothe the mountains south of Tehuacan.

Mexico enjoys a wealth of tropical and subtropical fruits, such as the orange, pine-apple, banana, coco-nut, pomegranate, anona, sapote, mango, and papaw, and loses correspondingly in the quality or flavour of most fruits of temperate climes. Among the special products of cultivation, indigenous or introduced, are the sugar-cane, cacao, coffee, vanilla, and agave, or American aloe. The last named, in Yucatan chiefly, furnishes the sisal hemp or fibre, while in major Mexico, an allied species yields the fermented national beverage known as *pulque*—the curse of beggarmdom, and the wealth of the endless *pulquerias* where it is sold.

The fauna of Mexico is necessarily a mixture of the faunas of South America and of the United States, the lowlands representing the elements of the former and the highlands of the latter. Zoogeographically it is a transition tract. The larger or more distinctive quadrupeds include the tapir, jaguar (*tigre*, with a range extending nearly or quite to the Texan frontier), ocelot, puma or cougar, coyote (prairie-wolf), peccary (ranging to Arkansas), ant-eater, and armadillo. Several species of monkey find a congenial home southward of the 19th parallel, but at least one form, as in the *sapotales* or sapote forests of the northern coast of Yucatan, reaches the 21st parallel. The birds are of great variety. Standing at the edge of the great plateau the traveller may be beguiled by the tones of the robin or mocking-bird, and three hours later by foot-walk his feathered companions will be the toucan, chattering parrots, the humming-bird, and cassique, or hangnest. Alligators, and perhaps even the American crocodile, are abundant in some of the lowland streams, as well as in bays and estuaries, and ordinarily they

are much more in evidence than the ophidians, large and small, which belong to the forest tract. Non-venomous water-snakes are singularly numerous in some of the plateau lakes. As special faunal elements should be mentioned the remarkable tailed amphibian axolotl, and from among insects, the travelling or foraging ants and nest-constructing termites.

People.—The inhabitants of Mexico resolve themselves into three categories : native Indians, of some 40 to 50 tribes ; Spaniards, or the descendants of the conquerors of Mexico, together with representatives of other European races ; and the mixed people resulting from a union of these two, who are often spoken of simply as *Mexicans*. Probably about 19 per cent. of the people are of European descent, 38 per cent. are native Indians, and 43 per cent. mixed races (Mexicans). It would appear that the native population has been steadily decreasing since the beginning of the nineteenth century. The Mexican Indians, with certain exceptions (Apaches, Comanches, Seris), are of a less warlike disposition than the Indians of the farther north, and, on the whole, may be said to be a hard-working, moral, and sober people, distinctly inclined to the arts of peace. Little or no prejudice exists against them as a race, and where by station or education they have advanced to a special grade of civilisation, they are accepted in marriage among the highest families of Spanish blood. They are kindly, courteous and dignified in mien and disposition, easily recognising the position which they occupy, and law-abiding to a most generous extent.

The most important of the hundred modern languages of Mexico are the Mexican (Nahuatl Aztec), Comanche - Shoshone, Mixteco - Zapoteca, Maya-Quiché and Otomi. The Nahua tribe of the *Mexica* (Mexicans) derives its name from *Mexitl*, a word of obscure origin and meaning, but often assumed to be synonymous with Huitzilopochtli, the Mexican God of War. That *Mexica* and *Azteca* (the people from Aztlan, "the land of the white heron") define the same people—a people migrating in from the north—admits of no doubt ; hence, we may assume that Mexicans and Aztecs (including the Toltecs, who appear to have been only Mexicans from the region about Tula, and not an earlier independent migratory horde) represent in part the people who were ruled by the various kings and monarchs styled Motecuzoma, Moctezuma or Montezuma.

To what period of construction belong the monumental ruins that are scattered through southern Mexico—in Uxmal and Chichen-Itza in Yucatan, of Palenque in the State of Chiapas, or of Mitla in the State of Oaxaca—still remains to be determined, although recent research does not seem to demand an antiquity exceeding 700 to 1,000 years.

History and Government.—When conquered by Cortez in 1521 Mexico was called the Province of New Spain : it remained a

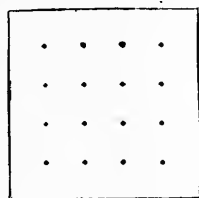


FIG. 369.—Average population of a square mile of Mexico.

dependency of the Spanish crown for precisely three centuries, and was ruled successively by Governors, Audencias, and Viceroy. On September 27, 1821, the Spanish power in Mexico finally terminated, after a struggle of eleven years. An Empire was proclaimed early in 1822; but this was

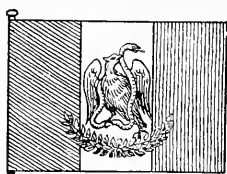


FIG 370.—Mexican Flag.

followed by the proclamation of a Republican Constitution in 1824. A generally stormy period led up to the war with the United States (April, 1846, to September, 1847). After some determined resistance on the part of the Mexicans, Maximilian, Archduke of Austria, as the representative of Napoleon III. of France, was placed upon the throne of Mexico in 1864, and thus was constituted the second Empire.

After the fall of the empire and the execution of the emperor in 1867 the Republic was re-established and became prosperous.

Mexico is now organised as a Federal Republic, composed of twenty-seven States, two territories, and one federal district, whose political organisation is almost identical with that of the United States. The powers of the government are vested in the Legislative, Executive, and Judicial bodies, the first-named consisting of a House of Representatives and of a Senate, representation in which is brought about by the suffrages of the people. The Executive or President is elected by electors popularly chosen and holds office for four years; there is no provision forbidding re-election.

Industries.—Mexico is one of the richest mining countries of the world, her mineral resources, which are as yet only partially developed, comprising gold, silver, platinum, copper, lead, iron and mercury. The annual output of silver is now claimed to be in value nearly £12,000,000, and of gold about £1,000,000. The main silver mines are comprised in the mining districts of Guanajuato, Zacatecas, and Catorce. An extensive industry is carried on in opals (principally from the region of Querétaro), and in the so-called "Mexican onyx," a beautifully shaded stalagmitic calcite which occurs in interbedded layers in the State of Puebla.

There are extensive manufactures of cotton and woollen goods (cloths, blankets, shawls), of leather (saddles and accessory trappings, shoes), and of felt and straw (hats); the pottery of Guadalajara is famous.

The cultivation of coffee is destined to become one of the foremost industries of the land, the lower tracts of the *tierra caliente* being particularly favourable to its growth. The coffee of Cordoba ranks but little inferior to the best coffee of the New World. Agriculture, although extensively practised, has in many districts hardly passed a primitive or experimental stage, and it is no uncommon thing to see the ancient forked or hooked stick serving for the plough-share. An equally primitive condition of the roadways and of transportation equipments prevails, transport over large areas being still almost exclusively by donkeys. During late years there has been an astonishing development of railroad enterprises, the length of roads operated by steam being, in 1901, over 9,500 miles. Two trunk

lines—the Mexican Central and the Mexican National—connect the City of Mexico with the United States frontier. The Mexican Railway, connecting the capital with Vera Cruz, was officially opened in 1873, and remains one of the most remarkable pieces of railroad construction.

Towns.—*Mexico* (Fig. 368), the ancient Tenochtitlan, capital of the Federal District and of the Republic of Mexico, is situated at an elevation of 7,350 feet above the sea-level. It combines the sumptuousness of a little Paris with the beggardom of Naples, the activity of a city of the north with the full inactivity of cities of the south. Here was established, in 1536, the pioneer printing-press of America, and, in 1693, the first newspaper (*Mercurio Volante*) of the New World. Schools, colleges, hospitals, and asylums flourish in abundance. The National Museum contains a most important collection of American antiquities—a treasure-house to the archæologist and ethnologist. The School of Fine Arts, or Academy of San Carlos, occupies the site where Fray Pedro de Gante, in 1524, founded the first school in the New World. The architectural features of the city are predominantly Spanish, the “palaces” of the wealthier classes down to the dingy shops of the poorer tradespeople, together with the arcades, municipal buildings, and churches, having fully accepted the controlling lines of Old Spain. The most striking edifice is the cathedral, the largest and most sumptuous church of America, erected on the site of the pyramidal temple of the titular god of the Aztecs.

The most important ports or harbours of Mexico are, on the Pacific side, Mazatlan, San Blas, Manzanillo, and Acapulco; and, on the Gulf coast, Tampico, Vera Cruz, Coatzacoalcos, Campeche, and Progreso (the last two in Yucatan). *Acapulco* has been described as the most beautiful Pacific port of all America, and, after Sydney, the finest harbour in the world. *Vera Cruz*, which has so long held supremacy as the eastern port, is destined to be supplanted by *Tampico*, the open coral-reef waters, in their exposure to the sudden and powerful north winds (*el Norte*), being unsuited for protracted anchorage.

STATISTICS.

Area of Mexico in square miles		..	..	..	..	1879.	..	1900.
Population of Mexico..		..	..	..	..	767,005	..	767,005
Density of population per square mile		..	..	..	..	9,908,011	..	13,545,462
		..	..	..	..	13	..	18
Population of—		1879.	1900.	Population of—		1881-85.	1900	
Mexico City	..	241,110	.. 344,721	Guadalajara	..	..	..	101,208
Puebla	..	68,634	.. 93,521	Monterey	..	..	..	62,266
Leon	..	—	.. 58,426	San Luis Potosi	..	..	..	61,019

ANNUAL TRADE (in pounds sterling).

Average 1871-75.		1881-85.	1891-05.
Imports 5,500,000 6,170,000 7,600,000
Exports 5,000,000 6,830,000 7,500,000

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BOOK V.: CENTRAL AND SOUTH AMERICA

CHAPTER XLI.—CENTRAL AMERICA

BY DR. CARL SAPPER,
Coban.

Central America.—The Central American republics—Guatemala, Salvador, Honduras, Nicaragua, Costa Rica—and the colony of British Honduras, occupy the greater part of the area of the land bridge between the North and the South American continents. They are bounded

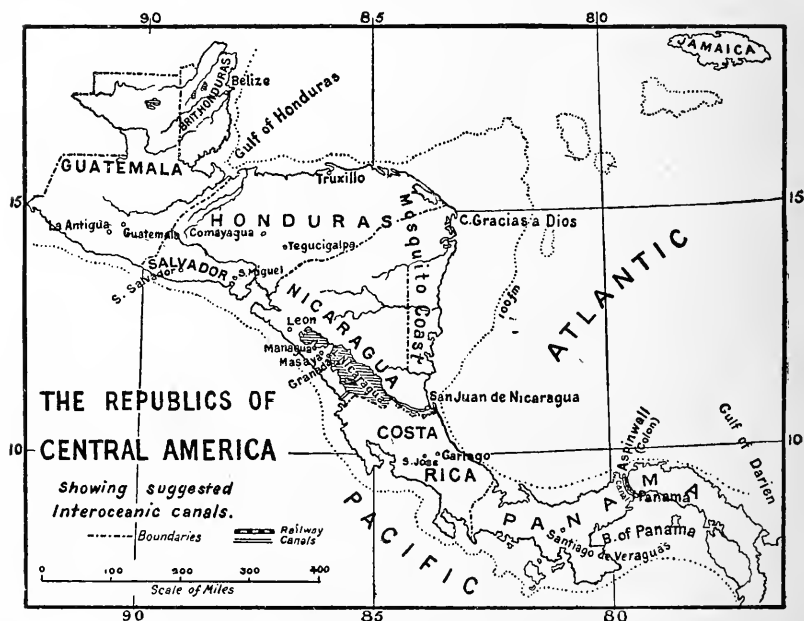


FIG. 371.—Central America.

on the north by the republic of Mexico, and on the south by the Colombian State of Panama, and lie between the Pacific Ocean and the Caribbean or Antillian Sea of the Atlantic. Both coasts are fairly uniform, forming only a few large bays, the Gulf of Honduras or Bay

of Amatique on the Caribbean, and the smaller gulfs of Fonseca, Nicoya, and Golfo Dulce on the Pacific side.

Orography and Geology.—Central America is very mountainous, the greatest heights occurring among the mountains of Guatemala and Costa Rica, while the ranges between them are only of moderate elevation. The beautiful cones of numerous volcanoes rise in a long, broken row near the Pacific coast; only where the land narrows in Costa Rica do they stretch across to the Atlantic side. The soft volcanic ashes which have accumulated are of great importance, forming plains in the mountain region, and, together with river deposits, along the coasts, where they materially increase the fertility of the soil. In the neighbourhood of the volcanic belt earthquakes are common and sometimes very severe, as the frequent destruction of towns testifies. Amongst the specially memorable catastrophes are those of Guatemala in 1773 and 1902, of San Salvador in 1854 and 1873, of Jucuapa (Salvador) in 1878, of Cartago (Costa Rica) in 1841 and 1851, of Rivas (Nicaragua) in 1844, and of Leon (Nicaragua) in 1609. Earthquakes are rarer and less severe in the non-volcanic districts and least frequent on the Atlantic coast. They are very rarely felt in British Honduras.

Surface of Guatemala.—In the northern republic of Guatemala it is easy to distinguish three orographic zones, the northern hilly plain of Peten, merging into the southern hilly district and northern plain of British Honduras; then the mountain chain of Central Guatemala, which attains heights of 12,500 feet, and the massive range of South Guatemala, which reaches 11,900 feet in Cerro Cotzic, and is continued towards the east into Honduras and Salvador. On the southern ridge of the last-named range numerous volcanoes rise, the highest, as determined by the triangulations of the inter-continental railway commission in 1892, are Tajumulco, 13,814 feet, Tacana, 13,334 feet, and Acatenango, 12,992 feet. The Pacific coast plain stretches at the foot of the volcanoes. The plain of Peten is composed for the most part of horizontally stratified recent Tertiary limestones. The northern chain of the Central Guatemala system, which appears to have been upheaved in middle Tertiary times, is composed of strongly folded and up-tilted early Tertiary and Mesozoic strata including an Upper Cretaceous limestone, which plays a large part. The middle chain is Palæozoic, including schists and Carboniferous limestones, and both chains are broken through by the transverse valley of the Rio Chixoy. The southern chain (Sierra de Las Minas and Del Mico) is of Archæan formation, principally mica-schist. Outbursts of granite, diorite, and serpentine pierce these ancient rocks. The cordillera in southern Guatemala is built up of recent eruptive rocks, partly andesite and partly basalt. Most of the volcanoes of Guatemala are extinct; during historic times eruptions have, however, been recorded of Tacana, Cerro Quemado, Fuego and Pacaya.

Surface of Salvador.—In the republic of Salvador the mountain

chains of recent eruptive rocks rarely exceed 5,000 feet in height, and are broken through by the transverse valley of the Rio Lempa. Steep-sided spurs of the Honduras Mountains in the north are separated from one another by deep-cut river valleys. The Pacific coast plain is rather narrow, and the main mountain ridge behind it contains most of the volcanoes, none of which reach 8,000 feet. During historical times the volcanoes Santa Ana, Quezaltepeque, San Miguel, Conchagua, and Conchaguita, have been active; Izalco was formed in 1793 and has since been continually in eruption; on the other hand, a new volcano which appeared in Lake Ilopango in 1880, has since nearly disappeared. The mountains of this republic have on the whole been little explored.

Surface of Honduras.—In the south of Honduras the mountains of recent eruptive rock are separated into different groups by deeply-trenched valleys, and some considerable depressions of the crest. In northern Honduras the mountains present the appearance of a chain, although eruptive flows play a considerable part in their structure: quartz porphyry in the southern, Mesozoic and granite in the northern, chain of Archæan rock. The latter reaches its greatest height in Congrehoy Peak, 8,040 feet. The mountainous Bay Islands, Roatan, Utila, and Bonaca are remnants of a former parallel chain. There are almost no volcanoes in Honduras except the extinct volcanic islands in the Gulf of Fonseca on the Pacific.

Surface of Nicaragua.—A great alluvial plain, similar to that of British Honduras, stretches along the Atlantic coast of Nicaragua, and behind it the extensive highlands of Segovia, Matagalpa and Chontales, composed of Palæozoic and Mesozoic strata with granite and basalt intrusions, reaches a maximum height of 7,000 feet. Beyond it there is a broad and remarkable depression occupied by the Gulf of Fonseca in the north, and further south by the great lakes of Managua and Nicaragua and the valley of their effluent, the San Juan river. On the west this depression is bordered by the low mountains of the coast cordillera. Numerous volcanoes rise from the volcanic ashes and tuffs with which the depression is covered, and many of them are active. Omotepe, on an island in Lake Nicaragua, is one of these, and the eruption of Coseguina in 1835 is famous as one of the most tremendous and disastrous known to history.

Surface of Costa Rica.—Two parallel mountain ranges run through Costa Rica, separated by the depression of Cartago; on the northern range there are several active volcanoes, two of which, Turrialba and Irazu, exceed 11,000 feet in height. The southern chain has also numerous lofty mountains, but its highest peak (the volcano Chiriqui, 10,150 feet) lies beyond the southern border. The geological formations are similar to those of Nicaragua.

Hydrography.—The rivers of Central America flow partly to the Atlantic Ocean and partly to the Pacific, but a few find their way into

lakes which have no outlet. The main watershed runs near the Pacific coast and thus the rivers entering the Atlantic are longer, and some of them are navigable in places for light-draught boats. It was proposed (before the United States took up the Panama Canal) to utilise the San Juan river flowing from Lake Nicaragua to the Caribbean Sea in the formation of a ship canal, to join the two oceans through the great lake. The Usumacinta and its chief tributaries, the Chixoy and Rio de la Pasion in northern Guatemala are navigable, but rapids on the border of the Mexican province of Tabasco interrupt communication with the sea. There are numerous lakes, chief amongst them the great Lake Nicaragua, with an area of over 3,000 square miles, and Lake Managua, which discharges into it. Lake Yzabal (Golfo Dulce) in Guatemala and the numerous very beautiful mountain tarns and crater-lakes in most parts of Central America are distinctive features. Lakes without outlet are common in the limestone region of northern Guatemala, the largest being Lake Peten; in the rainy season many shallow temporary lakes (*Akalches*) are formed in the hollows of the same region. Numerous lagoons of brackish water occur along both coasts.

Climate.—Central America lying completely within the tropics in 8° to 18° N., where the trade winds prevail, the climate would necessarily be damp and hot were it not for the prominent mountain system, which influences both temperature and rainfall. While the mean annual temperature on the coast is about 80° F., in Quezaltenango, at an elevation of 7,700 feet, it is only 58°. The annual range is comparatively small; the average temperature of the coolest month, December or January, is only from 6° to 12° below that of the hottest month, April or May. The direction and extent of the mountain ranges exercise the principal influence on the atmospheric humidity and rainfall. Where the east or north-east trades blow, the slopes facing the Atlantic are moister than those of the Pacific; on the latter coast only the southern slopes of the highest elevations in Guatemala extract a heavy rainfall from the sea breezes. The driest regions are those which are protected by mountain ranges from both oceans. All Central America is subject to numerous thunderstorms during the summer rainy season (*Invierno*), which reach a maximum shortly after each solstice. On the Atlantic coast the summer rainy season passes gradually into the trade wind rains, characterised by a minimum of thunderstorms but many rain showers of long duration, and leading to a winter rainy season with moderate precipitation, from February to April. On the Pacific slope a dry period (*Verano*) prevails from November to May. As an example of the influence of mountains on the distribution of rainfall it may be mentioned that the annual fall at Tual on the northern slope of the Central Guatemalan Chain (2,700 feet) is about 195 inches, in Coban on the top of the mountains (4,300 feet) 100 inches, and in Salama (3,050 feet) on the dry inland district of central Guatemala only 27 inches; while in Guatemala city (4,850 feet) on the crest of the Southern

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Cordillera the rainfall is 57 inches. The zone of maximum rainfall lies between 2,000 and 3,500 feet in elevation, above that precipitation often assumes the form of mist, and at heights above 10,000 feet, of snow.

Flora and Fauna.—Corresponding to the climate, the moist Atlantic side of Central America is covered with luxuriant primeval forest, which in the interior is rich in valuable wood, including mahogany and logwood, as well as in palms, creepers, and in the higher parts, tree-ferns, and epiphyte orchids. On the high mountains, oaks, alders, pines and cypresses are found. In the dry parts of the interior of the Pacific slope thin pine and oak woods cover the mountains, while the plains form grassy savannas diversified by thorny bushes. The driest parts of all are characterised by succulent plants such as the agave. On the Atlantic coast extensive deposits of sand are covered with grass and scattered pine trees, and known as Pine Ridges in British Honduras and on the Mosquito coast. According to the temperature there are three distinct floral zones. (1) *Tierra Caliente*, or hot land up to 2,000 feet, the principal zone of cacao cultivation, of the india-rubber and mahogany trees and of the coco-nut palm. (2) *Tierra Templada*, or temperate land from 2,000 to 6,000 feet, containing the principal belt of coffee cultivation. (3) *Tierra Fria*, or cold land above 6,000 feet, the principal grain and potato growing region. Cultivation stops at 10,500 feet, and forests at 12,500.

Animal life is also richer and more varied in the moist than in the dry regions. The principal mammals of Central America are the jaguar, the cougar, and smaller felidæ, wild swine, deer, monkeys, squirrels, and opossums. Bird-life is particularly rich, and the most beautiful bird of Central America, perhaps of the whole Earth, is the quetzal, which is limited to the forests of the moist and cool region. Snakes, some of them very poisonous, abound in the moist and hot region. Alligators and turtles are found in the waters of the hot land, and everywhere insect life is superabundant.

People and History.—In contrast with the luxuriance of plant and

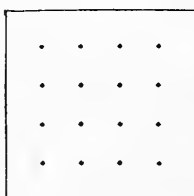


FIG. 372.—Average population of a square mile of Central America.

animal life in the moist, warm region, the human inhabitants flourish in the drier parts, where agriculture presents fewest difficulties and the conditions of health are favourable. The hot forest districts are very thinly peopled or even uninhabited, while a considerable density of population is found in the driest parts of the country. The prevalence of malaria in the low ground, both moist and dry, leads similarly to a concentration of population on the highlands, which are free from malarial fevers. Human habitations are found as high as 10,500 feet, but above that level the mountain slopes are uninhabited. On the low, hot plains of Peten, in Guatemala, there is only one person to two square miles, while in the high department of Totonicapan the density of population is 285 to the square mile.

The aboriginal inhabitants at the beginning of the sixteenth century were much more numerous than now, and were divided into many small tribes, always at war with one another. The only considerable kingdom was that of the Quiché, which had already begun to decline when some of the rebellious vassals of the Quiché king sought the aid of the Spaniards against their sovereign. Craftily taking advantage of the disunion amongst the Indian tribes Pedro de Alvarado, in 1524 and 1525, took possession of the greater part of Guatemala and Salvador with a handful of Spaniards, whose horses and firearms were objects of peculiar terror. Some years later the Verapaz district was peacefully brought under Spanish control through Fray Bartolome de las Casas, the famous historian of the Spanish conquest of America. Costa Rica was occupied by the Spaniards from Panama in 1522, and Honduras was taken in 1523. Cortez himself made an extremely difficult campaign through northern Guatemala and into Honduras in 1524-25. The agricultural native tribes of Guatemala, who were in possession of an old and highly developed culture and possessed organised government, were easily overcome in war, but so stubbornly did they resist the introduction of new ideas and customs, that to the present day a large number of them have remained free from intermixture and preserved their ancient language. The other Indian tribes, who stoutly resisted the Spaniards in arms, were gradually overcome or absorbed, and thus it happens that over 880,000 aboriginal Indians now live in Guatemala, while only 70,000 exist in the rest of Central America. The number of Indian languages now spoken is about thirty, but most of the Indians also speak Spanish. The majority of the population now consists of Spanish-speaking Ladinos or Mestizos, *i.e.*, offspring of Europeans and Indians. There are perhaps 30,000 Whites, Creoles and immigrants, and a larger number of Negroes, Mulattoes, the offspring of Negroes and whites, and Zambos, the offspring of Negroes and Indians.

In the seventeenth century the Mosquito Indians, who lived on the east coast, entered into friendly relations with the British Government, and by British intervention the Indians of the Mosquito coast, which now forms part of Nicaragua, retain special privileges. Logwood cutters from Jamaica settled on the coast of Yucatan in the seventeenth century, and the colonists, by defeating a Spanish attack in 1798, definitely established the colony of British Honduras. In the sixteenth century Central America and Chiapas formed one Spanish colony, the Captain-generalship of Guatemala, which became independent in 1823, when Chiapas was included in Mexico, and the rest formed the United States of Central America. In 1839 they broke up into five separate republics, and attempts at reunion, although frequently made, have hitherto come to nothing. In 1896 Nicaragua, Honduras and Salvador formed themselves by the Treaty of Ampala into the *Republica Mayor de Centroamerica*, with common representation in foreign countries, but the agreement did not continue. Although there is complete religious freedom in all the

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Central American republics, by far the most of the people are Roman Catholics.

Productions and Trade.—As yet minerals are only worked extensively in Honduras and the north of Nicaragua, where gold and silver are mined. There is a little gold-washing and some lead mines in Guatemala, and lignite deposits are known in several places, although not worked. There is scarcely any manufacturing industry except the weaving of silk, wool and cotton on a small scale. *Altos* in Guatemala has woollen factories and a great annual market is held at *Esquipulas*, in the same republic. The export of mahogany and logwood, india-rubber and other forest products is considerable ; Balsam of Peru is sent out from Salvador, and a certain amount of vanilla and sarsaparilla are also exported. Most of the people live by agriculture and the collection of forest produce, the nature of the cultivation depending on the climate, as each particular branch is concentrated in a special zone. Cattle-breeding is mainly carried on in the dry regions of the savannas and the scattered oak and pine woods, which form natural pastures. Honduras and Nicaragua are specially favourable for cattle-rearing, while the highlands in the high district of Guatemala are important for sheep. The cultivation of the cochineal insect was once important, but has now ceased. The cultivation of the soil is even more influenced by climatic conditions, although the most important crops, maize and beans, which form the staple food of the people, flourish in every climate and at all altitudes up to 10,000 feet. Other cultivated plants are confined to the warm, moist land, like cacao ; to the warm, dry land, like indigo ; or to the warm and temperate belt, like coffee, tobacco, sugar-cane, rice and cotton ; while others are confined to the cold land, like grain, potatoes and apples. Some products are insufficient for home use ; the cacao production barely suffices for the home demand and even flour must be imported from abroad. The only plantation product, except indigo from Salvador, which is exported in large quantities is coffee, which is of very fine quality, principally in Alta Verapaz and Costa Rica. Guatemala and Salvador have the largest coffee export, Costa Rica and Nicaragua produce about one-quarter as much, and in Honduras the export is only beginning.

Means of Communication.—The most important seaports of Central America are : in **Guatemala**, on the Pacific coast, the open roadsteads, *San José*, *Champereco* and *Ocos*, which carry on a large trade in coffee ; and on the Atlantic, *Livingston* and *Puerto Barrios*, the latter a good natural harbour, but not well situated for trade. The chief harbours of **Salvador** are *Acajutla*, *Triunfo* and *La Unión* ; in **Honduras**, on the Atlantic coast, *Puerto Cortez* ; and *Amapala* on the Pacific. **Nicaragua** has on the Atlantic side, *Bluefields* and *San Juan del Norte* (*Greytown*) ; on the Pacific, *Corinto* and *San Juan del Sur*. The harbours of **Costa Rica** are on the Atlantic side, *Puerto Limon* ; on the Pacific coast, *Punta Arenas*. The means of communication in the interior are still

somewhat undeveloped ; quite recently railways have been constructed or planned to the principal centres of coffee production, and lines joining the Atlantic and the Pacific seaports are open or under construction in Costa Rica, Honduras and Guatemala. Regular steamer communication is kept up on a number of the lakes. The system of roads, on which goods are conveyed in two-wheeled ox-carts, is still very imperfect, and in the mountainous parts of the interior only mules and other beasts of burden can be employed. The Indians still continue to carry loads on their backs in wooden vessels supported by a strap round their foreheads.

Political Divisions.—Central America is divided into six republics and one colony, the principal divisions and towns of which can merely be enumerated.

Guatemala is divided into twenty-two departments. The capital, *Guatemala*, an inland town, is the seat of an archbishop, of a university and other educational establishments. The other important places are *Quezaltenango*, *Antigua Guatemala*, which was formerly the chief town of Central America, *Chiquimula*, and *Coban*.

Salvador is divided into fourteen departments ; its capital, *San Salvador*, is the seat of a bishop and of a university, and stands near its port, *Libertad*. *S. Ana*, *S. Vicente* and *S. Miguel*, are the other towns.

Honduras is divided into fifteen departments, *Tegucigalpa* is the present capital, but that rank was formerly held by *Comayagua*, which is still the seat of a bishop ; both towns stand on the high plateau.

Nicaragua has thirteen departments. Its capital is *Managua*, on the lake of the same name, but *Leon* is a larger town and the seat of a bishop. *Granada* on Lake Nicaragua, *Masaya* and *Chinandega* are also large towns, and *Greytown*, at the mouth of the San Juan river, will become important when the projected Nicaragua Canal is carried out.

Costa Rica contains seven provinces. Its capital, *S. José de Costa Rica*, high up on the mountains, is the seat of a bishop, and *Cartago*, the former capital, is also an important town.

Panama.—Formerly a province of Colombia. See p. 828.

British Honduras.¹—The Crown colony of British Honduras, formerly dependent on Jamaica, was given a separate organisation in 1884. It is divided from Mexico by the river Hondo, and by the river Sarstoon from Guatemala in the south. The western boundary is an arbitrary line. The coast is bordered by a maze of small islands and coral reefs, rendering navigation difficult. The principal river is the Belize, crossing the centre of the colony, and separating the hilly southern part, where the Cockscomb Mountains reach 4,000 feet, from the flat northern portion, a great part of which is occupied by swamps and lagoons, or shallow lakes.



FIG. 373.—The Badge of British Honduras.

¹ By the Editor.

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Practically the whole area is under forest, and forest products, which attracted the "Baymen" in the seventeenth century, continue to be the staple exports of the colony. Mahogany and logwood trees are felled in the forests of the interior, and floated down to the coast, the quantity of the roughly hewn logs sent out each year largely depends on the amount of water in the rivers available for floating them. Coco-nuts and bananas are largely grown for the American market.

The population contains only one per cent. of Europeans; but, for the tropics, British Honduras is considered not unhealthy, many of the whites being descended from early immigrants. Besides the usual mixed races there are Caribs in the south, the remnant of those deported from the West Indies. *Belize*, the one town, is named after Wallace, an old buccaneer. It has no harbour, steamers having to anchor a mile or more from the river-mouth and work their cargo from lighters.

STATISTICS (*Approximate*).

	Area in sq. miles.	Population.	Density of pop. per sq. mile.	Largest Town.	Population.
Guatemala ..	42,400	1,365,000	32	Guatemala	65,000
Salvador. . .	8,100	780,000	96	San Salvador	25,000
British Honduras	7,500	31,000	4	Belize	7,000
Honduras ..	46,300	382,000	8	Tegucigalpa	12,600
Nicaragua ..	47,800	313,000	7	Leon	34,000
Costa Rica ..	20,800	263,000	13	S. José	19,000
Central America	172,900	3,134,000	160		

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CHAPTER XLII.—THE WEST INDIES

I.—GENERAL FEATURES

BY J. RODWAY,
Georgetown, Demerara.

Position and Structure.—The West Indian Islands extend as a natural breakwater in front of the Caribbean Sea and Gulf of Mexico, from 27° N. off the coast of Florida to 10° N. near the shores of Venezuela. They contain colonies of the Danes, French, Dutch, territories of the United States, and independent republics, but the United Kingdom holds the greater number of the islands. The islands vary in size from Cuba,

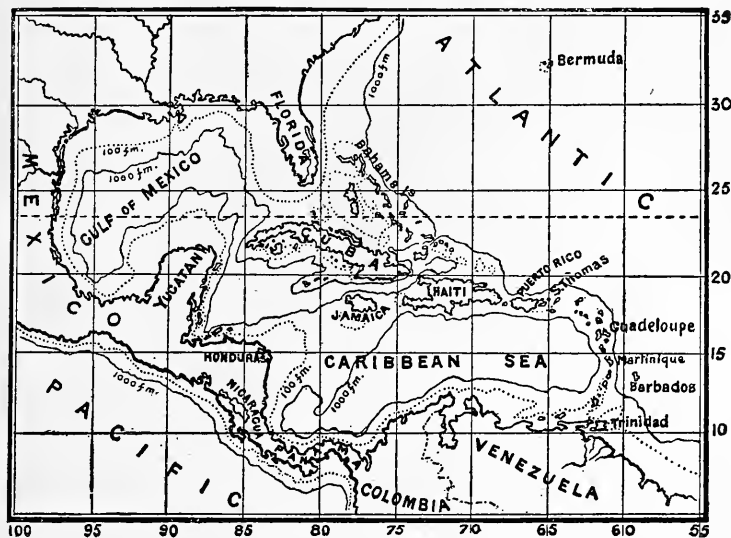


FIG. 374.—The West Indies.

which is one-third larger than Ireland, to tiny rocks and keys (or cays) just rising above the sea. They differ also in geological structure ; some probably once formed part of the continent, some are composed of volcanic rock, others only of coral. Most of them have central ridges of mountains, and many signs of active volcanoes may be seen in the Caribbees, where eruptions and earthquakes are still experienced at intervals. Taken as a whole the islands appear to form a great mountain chain, similar to the

Andes, but deeply submerged. Rushing mountain torrents are common in all the islands ; their gullies, at one time nothing more than beds of sand and pebbles, are at another full and overflowing.

Rising from the deep blue sea, covered with rich green forests, and bathed in the splendour of tropical sunlight the rocky islands are exceedingly beautiful. In sailing or steaming along from one to another they look like ocean gems ; here a mountain enwrapped in clouds, there a field of yellow-green canes, again a little town embosomed in precipices.

Climate and Vegetation.—The climate is purely tropical. The sea-level temperature over the whole of the West Indies exceeds 80° F. on the average from May to October, and in the cooler months rarely falls below 75° F., the annual range being very small. Rainfall and local varieties of climate are dominated by the trade winds, which blow all the year round. From October to March the north-east trades blow strongly ; as summer advances they become rather weaker, and eddy, so as to blow from the east and south-east over the whole group, gradually returning to a north-easterly direction about September. One consequence of the steady easterly winds is that the windward or eastward coasts of the Caribbees are beaten on by a continual surf, while the leeward or western coasts have usually calm water, and deep, unsilted harbours. All the important towns of the Lesser Antilles lie on the west of the islands. The rainy season takes place towards the end of summer, October being the wettest month as a rule, and the dry season is at its height between December and April, when the northerly component predominates in the wind. From August to October hurricanes are frequently experienced. The local climates vary considerably in the various islands. The Bahamas are cooler and more healthy than the Caribbees, and in Jamaica the inhabitants have the cool mountain slopes to which they can retire when the coast is uncomfortably hot.

Most of the land is fertile, and in some islands particularly rich, although in others, such as the Bahamas, it is almost barren. There are few wild animals, but birds and insects are plentiful, while the flora is particularly varied and interesting. All tropical fruits and vegetables can be grown, but the staple has hitherto been sugar cane. Latterly the low price of sugar consequent on the bounties given by European countries to encourage beet growing has reduced many of the West Indian islands to a very low condition, a state of things intensified in some of the islands by civil war and bad government.

People.—Since the discovery of the West Indies by Columbus in 1492 the original inhabitants have almost entirely disappeared, leaving only a few degenerate half-breed Caribs in St. Vincent. The great labour experiment of negro slavery was tried on a vast scale, and, whatever may have been the evils of that system, there is no doubt that it was successful from an economic point of view. It has resulted in peopling the islands with a tropical race which seems well fitted to carry out their development,

and may perhaps some day make an impression on the world. Without the negro these beautiful islands would possibly have been abandoned long ago, for since the emancipation of slaves the whites are becoming fewer and fewer every decade, except in Cuba and Porto Rico. Experiments have been made in bringing labourers from India and China with good results in Trinidad, but the general position of all the islands in 1899 may be considered as almost stagnant. Yet they were of great value in the past, when they were "bones of contention" between the four great nations which fought for them, and with them the sovereignty of America. Spain was put in the background by Holland, France, and the United Kingdom, and, after many changes, the existing partition of the islands was brought about. The future of the West Indies is bound up with the future of cane-sugar; other tropical products seem likely (1898) always to remain of secondary importance.

The islands are linked together by telegraph cables, which connect with North and South America. There are several lines of steamers running regularly between the West Indies and Europe

II.—CUBA

BY ROBERT T. HILL,

Geologist, U.S. Geological Survey.

Position and Coasts.—Cuba, the largest and richest of the West Indian Islands, lies just within the tropics; its most northerly point is within 100 miles of Key West, its most southerly within 100 miles of Jamaica. The island is 720 miles long, and from 25 to 100 miles wide. Its area, including 1,300 keys (cays) or islets, is 45,000 square miles, of which 10 per cent. is cultivated, 4 per cent. forest-land, and the rest unreclaimed. Cuba has three natural divisions, the eastern mountains, the central plains with occasional hills, and the western central axial mountains bordered by sloping valleys. Excepting the swamp region, the island is thoroughly drained. The coast-line measures 2,000 miles; with embayments and islets it is over 6,800 miles. Except on the south central side the coast is abrupt, and bordered by a narrow bench of coral reef elevated 15 feet above the sea. The eastern coast, 600 feet high, is rugged, with stair-like terraces. The land-locked harbours with narrow entrances are adapted for commerce and defence. The keys,

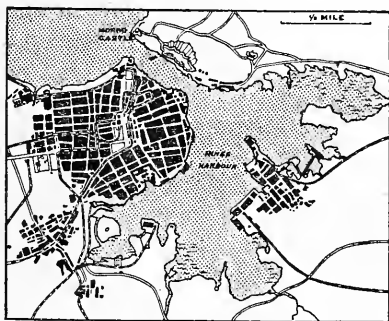


FIG 375.—Havana Harbour—a typical natural harbour of Cuba.

which border one half the coast, are coral or mangrove islets growing up from shallow platforms ; lack of good water makes them uninhabitable.

Configuration.—The higher eminences in the interior are true mountains of deformation, composed of disturbed sedimentary rocks with igneous intrusions. They occur in three independent groups in the eastern, western and central portions. The highest range, the Sierra Maestra, dominates both coasts of Santiago de Cuba. Its loftiest crest, Pico del Turquino, has an estimated height of 6,800 feet ; its lower slopes are terraced. The central high mountains are less angular than the Sierra Maestra, and their summits (the highest, El Potrerillo, 2,900 feet) have radiating slopes. They are composed of semi-crystalline limestones and shales, doubtfully considered Palæozoic, flanked by disturbed Cretaceous and Tertiary beds. The Sierra de los Organos forms the island's axis west of Havana, and is an elongated ridge of various geological formations. It culminates in the Pan Guajabon, altitude 2,532 feet. Low hills and mesas of circumdenudation capped by Tertiary limestone, 3,000 feet of which once enveloped the island, form an extensive plateau north of the Sierra Maestra, with terraced cliffs towards the sea ; they include the Mesa Toar and Junki de Baracoa, sometimes mistaken for craters. The upper edge of this plateau is cut into knife-edged salients ; the lower stair-like benches are crossed by vertical canyons, through which the drainage finds outlets to the sea. In Matanzas and Havana provinces, the arch of the plateau, whose crest on the northern side presents a cliff topography, descends nearer sea-level, develops a longer but gentle slope toward the south coast, and ends in the Zapata Cienaga and the shallows between Cuba and the Isle of Pines. The brackish swamp, Zapata, occupies 600 square miles on the southern coast. The famous valleys of Cuba are either wide plains threaded by rivers reaching the sea, or amphitheatres within the limestone plateau.

The rivers are voluminous in proportion to their catchment areas. The streams run through widely sloping valleys ; canyons are not developed until the coastal rim of harder limestone at the entrance of the pouch-shaped harbours is reached. Many streams flowing southward disappear in vast swamps. In limestone formations the drainage is mostly subterranean, and beautiful caverns abound, the largest underlying the eastern Cuchillas. There are also waterfalls, natural bridges, mineral springs, and baths, the usual accompaniments of such karst phenomena.

Climate.—There are no extensive climatological records except for Havana, and these do not apply throughout Cuba. Rains are most abundant from May to October ; those brought by the trade-winds are heaviest and most frequent on the higher eastern slopes. At Havana the annual rainfall is about 52 inches, of which 32 inches fall in the wet season. The average number of rainy days in the year is 102. The air is usually charged with 85 per cent. of moisture. Snow has only once been recorded in Cuba, in 1856. At Havana the mean annual temperature is 77° F. ; in

July and August the average is 82° F., fluctuating between 88° and 76°; the highest temperature recorded there during ten years was 100°. In December and January the thermometer averages 72° with a maximum of 78° and a minimum of 50°; but on the interior elevations the freezing point is reached in winter. The diurnal range of temperature averages 10°. At Santiago the temperature is higher than on the northern and western coasts, and averages 80°, with a difference between the warmest and coldest months of 6° F. The easterly trade-wind prevails, but from November to February cool north winds of short duration occur in western Cuba, where also a refreshing sea-breeze blows in the afternoon. The island is subject to hurricanes.

Flora.—A voluptuous flora covers the surface and includes characteristic forms of the West Indies, southern Florida, and the Central American seaboard. Many large trees of the Mexican *Tierra Caliente* reappear in western Cuba. Numerous palms, including the royal palm, occur, and the pine tree is associated with palms and mahoganies in Pinar del Rio and the Isle of Pines; other woods are the *lignum-vitæ*, the *granadilla*, coco-wood, out of which reed instruments are made, and *Cedrela odorata*, used for cigar boxes and linings of cabinet work; *fustic*, logwood, and mahogany are largely exported from Santiago. There are still about 13,000,000 acres of uncleared forest. Nutritious grasses are found; the pine-apple, manioc, sweet potato, and Indian corn are indigenous. More than 3,350 native plants have been catalogued.

Fauna.—The peculiar fauna includes only a few indigenous land mammals. One rodent, the agouti, is as large as our domestic rabbit; another is the solenodon, whose family has other representatives only in Haiti and Madagascar. There is a species of iguana, but there are no poisonous snakes. The crocodile, on the Isle of Pines, is the species which occurs in southern Florida, Jamaica and Central America. There are few fresh-water fishes. A large lepidosteus, similar to the alligatorgar of the southern United States, occurs. Insect life abounds, and there are many arachnids. Land molluscs with gorgeous colouring are found. Birds are numerous, and the parrot is conspicuous; there is only one indigenous humming bird. Collectively, the fauna proves the long isolation of Cuba from continental lands.

History and People.—Beginning on the west, Cuba is divided into six provinces, Pinar del Rio, Havana, Matanzas, Santa Clara, Puerto Principe, and Santiago. A century before the Anglo-Saxon settlement of the New World, Spaniards colonised Cuba and built Baracoa, Santiago, and Havana. A search for gold yielded little return except the ornaments of the soon exterminated natives. Pastoral pursuits developed; the indigenous tobacco, and sugar-cane imported from the Canaries, were cultivated and African slavery introduced. Morro Punti and other fortresses were begun before 1600. The second century of occupation saw increased agricultural development and colonisation, and fear of English

buccaneers and French and Dutch pirates resulted in the primitive fortifications of the coastal cities. The wise administration of Las Casas and its after influences held Cuba loyal to Spain, even during the times (1794-1820) when the latter lost her mainland colonies and San Domingo. The Spanish decree of 1825 gave the Captains-general despotic authority, ended domestic peace, and initiated insurrections which only ended with the fall of Santiago in July, 1898. During the nineteenth century Spain made various pretences of extending Cuba's political privileges, but all lacked the true essence of local self-government, and absolute power remained with the Spanish Captain-general. The Spanish government was devoted to the enrichment of officials and to retaining Cuba as a colony. The United States resolved in 1898 to put a stop to bad government in Cuba, and after a short war with Spain the island was taken under American protection on January 1, 1899. A constitution was adopted in 1901, and in 1902 Cuba became an independent republic. The people of Cuba are for the most part descended from the early Spanish settlers, reinforced by later immigrants from southern Europe, and affected in part by a considerable infusion of negro blood. It is impossible to obtain accurate statistics of the changes of population, because no reliable census was taken for many decades. About 32 per cent. of the population are black or coloured, using the latter word to mean a mixture of the black and white races. The Spanish language is in universal use, and almost all the people are Roman Catholics. There is a university at Havana, and there are now many schools.

Resources.—The products of the island are sugar-cane of a superior quality, tobacco, coffee, bananas, Indian corn, oranges and pineapples in the order named. Cuba leads the world in sugar production, the amount of which in 1893-94 was 1,054,000 tons, all of which except 30,000 tons was exported. During the revolution the production sank to one-third, but in 1900-01 it had risen again to 600,000 tons. The sugar lands are upland soils, and more fertile than those of the other West Indian islands; the cane is planted only once in seven years; no fertilisers are used; the estates possess recent inventions for the cultivation of the cane, the extraction of its juices, and their conversion into the crystal. Thus sugar cultivation in Cuba has remained profitable in spite of the general depression in the cane-sugar trade.

Tobacco, while secondary to sugar, is far more profitable in proportion to acreage. This product grows well throughout the island, but the chief seat of its cultivation is the southern slopes of the Sierra de los Organos, in Pinar del Rio—the famous Vuelta Abajo region. Good tobaccos are exported from *Trinidad*, *Cienfuegos* and *Santiago*. There are large cigar factories in *Havana*, and great exports of baled tobacco from eastern Cuba are sent mostly to the United States. Coffee (introduced by the French from Martinique in 1727) was once extensively exported, but the trees have been replaced by sugar-cane or destroyed during revolutions. Bananas

have been an important export in eastern Cuba. Delicious oranges grow everywhere. Pine-apples are exported from western Cuba and the Isle of Pines. Besides the large estates there are many small farms devoted to fruit growing, market gardening and dairy products.

On the fertile grazing lands of Santa Clara, Puerto Principe and Santiago, fine animals of Spanish stock are produced. Horses are bred throughout Cuba. The developed mineral resources are iron ores, asphaltum, manganese, copper and salt. A little gold and silver were mined in past centuries. Iron ore has proved the chief metallic resource; the Sierra Maestra mines produce mixed brown and red hematite, containing from 65 to 68 per cent. of pure iron. They occur in the white limestone that for 2,500 feet incrusts the seaward face of the porphyritic and granitoid core of the mountains. The production in 1890 was 362,068 tons, amounting to one-fourth the total importation of iron ores into the United States for the same period. Rich deposits of manganese occur in the Sierra Maestra range near Ponupo. Asphaltum of unusual richness is found near *Villa Clara*, beneath the waters of Cardenas Bay and in beds of late Cretaceous and early Eocene age. Copper occurs at many places; from 1524 to 1867 it was mined at *Cobre*. Salt is made abundantly along the northern keys. There are natural salt pans along the margin of Cayo Romano, depressions twelve to sixteen inches deep, separated from the sea by coral banks over which the waves wash in stormy weather. Clays for brick and roofing tiles abound in the non-calcareous formations, especially in the eastern provinces. The universal building material is limestone and lime products, such as plaster and cement.

Communications.—The larger part of the thousand miles of public railways is comprised in the United System of Havana, which extends west and east from Havana through the tobacco and sugar districts of the Vuelta Arriba and Vuelta Abajo and, within a day's journey, reaches the principal cities west of Cienfuegos and Sagua la Grande. The western terminus is Pinar del Rio, 106 miles from Havana; the eastern terminus is Villa Clara, 150 miles distant. One line runs south from Havana to Batabano and meets the south-coast steamers. On sugar-estates narrow-gauge railways are freely used in handling cane; they communicate with the interior, in connection with coasting steamers and broad-gauge lines. Good highways are short and few; and even common roads for wheeled vehicles hardly exist, except near larger towns.

Trade.—Most of Cuba is accessible to maritime transportation. The



FIG. 376.—The Railways of Cuba.

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chief harbours on the north coast are Bahia Honda, Cabanas, Havana, Matanzas, Sagua, Nuevitas, Gibara, Nipe, and Baracoa ; and on the south, Guantanamo, Santiago de Cuba, Manzanillo, Trinidad and Cienfuegos. The shipping trade, both foreign and coastal, is extensive ; steamers coast the island, the north coast being served from Havana and the south from Batabano, the southern out-port of Havana. Although Cuba naturally commands the commerce of the American Mediterranean, trade and communication with the adjacent regions, other than Mexico, have not hitherto been encouraged. The essentials of Cuban commerce are : (1) a large balance of trade in favour of the island ; (2) preponderating consumption of the exports by the United States ; (3) the division of the imports between other countries ; and (4) the absence of trade with the neighbouring regions—except the United States—of which the island is the natural commercial centre. The trade of the United States with Cuba, which has recently been summarised by Mr. John Hyde, statistician, reached its high-water mark in 1892-93, when it amounted to £20,460,000, the ratio of imports, £15,741,000, to exports £4,721,000, being approximately as ten to three. In 1901 the total was £14,200,000, of which the exports amounted to £5,300,000, showing a remarkable proportionate increase.

STATISTICS (*approximate*).

Area of Cuba, in square miles	45,000
Population (1899)	1,572,845
Density of population per square mile	36

POPULATION OF CHIEF TOWNS, 1902.

Havana (Habana)	275,000	Matanzas	36,374
Santiago	43,090	Cienfuegos	30,038
Puerto Principe	25,102	Cardenas	21,940

There are no trustworthy trade statistics on account of the long period of political disturbance in the island.

III.—PORTO RICO

By ROBERT T. HILL,

Geologist, U.S. Geological Survey.

Position and Configuration.—The island of Porto Rico lies in the same tropical latitude as Jamaica, and is separated from Cuba by the island of Haiti. Although discovered by Columbus in 1493, and conquered in 1508 by Ponce de Leon, it has never yet been systematically explored. The island is 95 miles long, 35 miles wide, and has a coast-line of 360 miles. It presents a picturesque hilly landscape. Central mountains with broken slopes extend through its greatest length, and culminate in the Yunque of the Sierra Luquillo, 3,609 feet high. Remnants of the virgin forests are still found on the sierra heights. The slopes are gently rolling divides, succeeded towards the littoral by well-drained plains. The undulating surface is adapted to pasture and the more ordinary kinds of cultivation, and is intersected by numerous perennial rivers.

According to Cleve, the Swedish naturalist, the northern hills are fragments of a thick series of limestone strata which have been cut through by water. They have little inclination, and dip seaward from the axis of the island at a low angle. The mountain summits are covered by the Antillean Tertiary limestone, a formation which is usually hard and yellowish-white. In the mountains of the interior an older formation of conglomeratès and metamorphic rock, similar to the older rocks of Jamaica, is visible below the limestones. The rocks of the littoral are probably elevated coral reefs. Great living reefs abound along the south coast. The numerous streams have contributed to the wealth of Porto Rico ; some are navigable for small vessels, but have troublesome bars across their mouths.

Climate.—The mean monthly temperature hardly varies 6°, and the extreme limits observed are within 40° of each other. The hottest months are June, July, August and September ; the coolest, December, January and February. The average daily temperature is 80° F., but a cooling north breeze prevails during the hottest days. The thermometer averages 88° F. at noon, sinks to 81° at night, and sometimes falls to 61° F. The highlands are cooler, but snow never falls, and hail rarely. Disagreeable land winds are unusual ; but tropical hurricanes are frequent between July and October. The central mountains cause frequent showers on the northern side, while the southern district remains without rain for months. The average annual rainfall for twenty-five years at San Juan is 54 inches, that at a station in the Yunque, 134 inches. The driest months are January and February, the wettest are October and November.

Resources.—According to Cleve, mercury is found in the Rio Grande, and gold in loose pieces in the Sierra Luquillo and Corozal rivers ; placer gold was mined by early Spanish settlers. Specular iron is reported, notably on the Rio Cuyul, and magnetic iron ore from Gurabo and Ciales ; agate of good quality, malachite and other ornamental or precious minerals occur.

Porto Rico contains many large trees ; in the higher parts the forests are open, and largely without parasitic vegetation. The species include several palms, two tree ferns, cedar, ebony, sandal-wood and many trees suitable for building purposes ; while there are numerous medicinal plants and others used for condiments, dyes and tanning.

Agriculture is sufficiently diversified to produce food for the inhabitants besides large crops of sugar and coffee for export. The land is mainly divided into small independent holdings belonging to the peasantry of the interior. Small fruit farms are the most numerous, but there are many small and some large coffee estates, and a number of sugar estates, cattle farms and some tobacco plantations.

The island contains no native mammals, except a single species of agouti, although introduced domestic species flourish. In the mountains there are many birds ; flamingos and other water-birds frequent the coast ; fish abound in the fresh water, and a gigantic tortoise is found.

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People and Government.—Porto Rico for three centuries was only a penal station. The aborigines, of Arawak or Carib stock, were nearly exterminated in 1811 after an uprising against the Spanish. The present native people are of four classes: the Creoles, who call themselves Spaniards; the lower class of white peasantry, or Gíbaros; the coloured people, or Mestizos; and the blacks. In 1615 a decree invited colonists to the island on most liberal terms. Lands were allotted gratis; the settlers were free from direct taxes, and for a certain number of years from tithes, alcabala, and export duties, which then formed an impolitic feature of the Spanish system. With this decree the prosperity of Porto Rico began, and Spanish capitalists driven from San Domingo and the Spanish Main about the same period, helped to develop the resources. The negroes of Porto Rico are in a minority. When emancipation was given in 1873 industry survived, the planters continuing their agricultural operations without financial ruin or social disorganisation.

For administrative purposes the island was divided into seven departments, including seventy villages. These departments, named after their chief towns, each contain about 100,000 inhabitants. Three small islands adjacent to Porto Rico constitute parts of its political organisation. These are Mona on the west, and Culebra and Vieques on the east.

Porto Rico was assumed as United States territory at the close of the Spanish-American war of 1898, when Cuba was taken under American protection. The Catholic bishopric of Porto Rico was founded in 1504, under Pope Julian II., and was the first established in the New World. Instruction is divided into primary, secondary and superior. There are eight superior schools for boys, four for girls, and many elementary classes and private schools, while in San Juan there is a college, with courses in medicine and law, and a normal school for both sexes. Eighty-seven per cent. of the people are, however, illiterate.

Trade and Towns.—The industries are limited to the preparation of sugar and coffee for market, and the manufacture of tobacco, chocolate, wax, soap, matches, rum and straw hats; but there are a few foundries for manufacturing iron machinery. The productions for export are sugar-cane, coffee, tobacco, cacao and cotton. Sugar-cane on the lower slopes and plains yields about 6,000 pounds to the acre. A peculiar variety of upland rice, together with yucahía and plantains, are staple foods of the labourers; bananas, maize, beans, yams, sweet potatoes, mangoes, pine-apples and other fruits are also of importance.

The larger commercial towns, mostly seaports, are: *San Juan, Ponce, Mayaguez, Aguadilla, Arecibo, Fajardo, Naguabo, Arroyo, and San German*. The principal ports are San Juan on the north; Fajardo and Enshhada Honda on the east; Ponce and Guanica on the south; and Puerto Real de Cabo Rojo on the west. Playa is the best port.

The island has communication by steamer with Europe, the other

islands of the West Indies, and the two neighbouring continents; two lines of steamers circumnavigate it, stopping at the various ports. There are about 150 miles of railroad in operation, and as much under construction.

STATISTICS.

Area of Porto Rico in square miles	..	..	..	..	..	..	..	3,668
Population of Porto Rico in 1899	..	..	..	..	..	..	..	953,243
Density of population per square mile	..	..	..	..	..	..	..	260
Population of Ponce	..	..	..	..	..	..	..	27,952
„ San Juan	..	..	..	..	..	..	..	32,648

COMPOSITION OF THE POPULATION.

White.	..	..	Coloured.	..	..	Negro.	..	..	Total.
589,426			304,352			59,390			953,243

IV.—HAÏTI AND SANTO DOMINGO

By J. RODWAY,
Georgetown, Demerara.

Physical Features of Haïti.—The island of Santo Domingo, better known by its old Carib name of *Haïti* (rough land), or by the name *Hispaniola* bestowed on it by Columbus in 1492, is separated from Cuba by the Windward Passage, and from Porto Rico by the Mona Passage, both much frequented by vessels entering the Caribbean Sea. The outline of the coast is remarkable, and the island is nearly as large as Ireland, the length being about 400 miles and the greatest breadth 160. Four chains of mountains corrugate its surface, running nearly parallel to each other, separated by depressions, and all trending nearly east and west. The Monti Cristi range, parallel to the north coast, is succeeded by the great Cibao Chain, which forms the north-western peninsula and runs to the extreme east end of the island; it bears the highest summit in the West Indies, Loma Tina (10,300 feet). Between these ranges lies the broad plain called by Columbus *Vega real* or the royal garden, a region of great fertility, traversed by large rivers. The southern range forms the south-western or Tiburon peninsula, and runs along the western half of the south coast. Gold, silver, copper and other minerals are found, while for the variety of its vegetable productions it is unexcelled by any of the other islands.

History and People.—This magnificent island was the first to be colonised by Spain, and horrible persecutions and massacres of the natives took place, which led to the entire extinction of the aborigines within about fifty years. Haïti was then almost deserted for a time, save as a place of call. Plantations were neglected; cattle, hogs and dogs ran wild and increased to a wonderful degree, until the French buccaneers settled in some of the western bays, and especially on the small island of Tortuga. They lived by hunting the wild cattle and by piracy, until gradually taking

possession of a great portion of Hispaniola, about one-third of the island was ultimately ceded to France by treaty in 1697. From that period the portion now known as Haïti became the most flourishing colony in the West Indies, until by the blunders of the first French Republic and then of Napoleon I. it was entirely lost. The Republic declared the rights of man and freed the slaves; Napoleon, on the petition of the whites, rescinded this resolution, and ordered the negroes back into slavery. The result was a series of massacres, ending in the erection of a negro republic where no white man could hold any real property. Since 1810 there have been negro emperors, kings, and presidents, Haïti has been joined to Santo Domingo, which proclaimed its independence in 1821, and again separated, and the whole island has been almost ruined. There are, however, no reasons why it should not be very prosperous, save the want of good government and the virtual absence of white men.

The Republic of Santo Domingo.—The eastern republic of Santo Domingo is divided into six provinces and six maritime districts, and is governed by a President and a Congress of twenty-four members, who are elected for two years. The exports are coffee, timber, tobacco, cacao and sugar. The capital is the old Spanish city of *San Domingo* on the south-east coast, and there is a port on the north named *Puerto Plata* of about the same size. The Spanish language is universally spoken; but the people are almost entirely negroes and half-breeds.

The Republic of Haïti.—The western portion of the island known as Haïti is smaller in area, but of greater importance than its sister republic, still retaining the superiority which existed while both were European colonies, and that due to its command of the great western gulf between the two long mountainous peninsulas. The government is administered by a President, Senate, and House of Representatives, but it is generally considered to be rather that of a military despotism than of a republic. The capital is *Port-au-Prince*, the towns of *Cape Haïtien*, and *Aux Cayes* are also important. A patois derived from French is commonly spoken, but pure French is the tongue of the better classes. There are but few whites, and these labour under civil disabilities that may almost be compared with those formerly laid upon the coloured people under French rule. The exports are coffee, mahogany, logwood and cotton.

There are several islands off the coast; the largest is Gonave, 37 miles long by 9 wide, but on account of its being destitute of springs, it is hardly habitable. There is also the old rendezvous of the buccaneers, Tortuga, which is 22 miles long by 8 broad, and La Saona, nearly as large.

STATISTICS (estimates about 1890-91).

	Area sq. miles.	Popu- lation.	Density of Pop.	Imports £	Exports £	Capital.	Popu- lation.
Santo Domingo..	18,045	610,000	34	537,000	585,000	Capital. Santo Domingo	15,000
Haïti	10,204	1,400,000	140	2,012,000	2,833,000	Port au Prince	50,000

V.—THE WEST INDIAN COLONIES

By J. RODWAY,

Georgetown, Demerara.

THE BAHAMAS

Bahamas.—The Bahama Islands are the most northerly of the West Indies, comprising about 3,000 low coral islets, rocks and banks. The whole group is a British possession, and about twenty of the islands are inhabited. The most important are New Providence, Abaca, Harbour Island, Eleuthera, Inagua, Mayaguana, Ragged Island, Rum Cay, and the Biminis, all of which are ports of entry. Besides these there are the Great Bahama, Crooked Island, Cat Island and Watling Island (San Salvador), Columbus's supposed landfall. Compared with the southern islands most of the Bahamas are little more than barren wastes, rising but a few feet above sea-level, in some places so low that salt lagoons penetrate to great distances beyond the shore. The most conspicuous plant is the agave, from which sisal hemp is obtained as an article of commerce. Some of the islands are covered with its rosettes of spiny leaves almost to the exclusion of other weeds.

People and Industries.—Three-fourths of the population are black or coloured people; but the English language is the only one spoken. The islands were originally taken possession of by the English at the first settlement of Virginia, but for a long period they were little more than harbouring places for pirates. The early colonists suffered from the raids of Spaniards and French, and in 1781 the islands were captured by the former, to be restored to Great Britain, however, at the peace of 1783.

The main industries are sponge-fishing and salt-raking; from natural ponds, where sea-water is continually flowing in and evaporating, the crystals of salt are raked into flat-bottomed punts and piled in heaps on the shore until ready for removal. Coral, shells and turtle-shell are also obtained by fishing and diving; fruit and early vegetables are grown for the American market, and some of the islands yield guano. The capital and only town of importance is *Nassau* on the island of New Providence.

JAMAICA

Position, Surface and Productions.—About 100 miles west of Haïti, and 100 miles south of Cuba comes Jamaica, the largest of the British West Indies. From east to west its greatest length is about 150 miles, and its breadth from north to south 50 miles. A range of mountains runs through the axis of the island from east to west with numerous projecting spurs; the highest peak of the Blue Mountains rises to 7,400 feet. Numerous small rivers flow from both sides of this range, but none are navigable. The name "Jamaica" comes from a native word meaning

"land of springs." The climate differs according to altitude, that of the lower levels being typically tropical, while the temperature on the hills is lower according to the height. There are extensive forests, and the mountain streams are broken by numerous falls and cataracts.

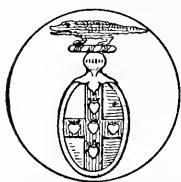


FIG. 377.—The Badge of Jamaica.

All tropical productions can be grown to perfection, and the exports are more varied than those of the other British West Indies. The sugar plantations, once so famous, have now dwindled to an area of only 26,000 acres, and although other products have been largely increased by the introduction of banana and orange planting for the American and British markets, the island has never regained the prosperity which it lost on the emancipation of the slaves. Its chief exports are now bananas, oranges, sugar, rum, coffee, ginger, pimento, logwood and cacao.

People, History and Government.—The population consists mainly of black and coloured people, the whites numbering only 2½ per cent. of the whole, and the proportion of East Indians is about the same. The island was first settled in 1509 by the Spaniards, and was conquered in 1655 by a British force sent out by Oliver Cromwell, since which time it has remained in the hands of Great Britain. Charles II. granted it a constitution in 1662, but in 1866 this was surrendered in favour of a Governor and Council, partly official and partly elective. The island is divided into three counties, Cornwall in the west, Middlesex in the centre, and Surrey in the east; these are subdivided into parishes the unit of local government being the Parochial Board.

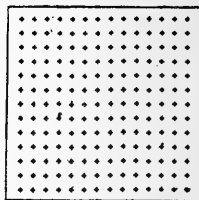


FIG. 378.—Average population of a square mile of Jamaica.

Resources and Towns.—There are few industries beyond the raising of agricultural produce. Jamaica rum has long been famous throughout the world, and is unique in flavour. Jamaica coffee and ginger are also well known, while pimento is obtained almost exclusively from this island. Attempts have been made to introduce tobacco growing and cigar making, but hitherto with only moderate success. The capital is *Kingston*, which is well situated on a good harbour in the south-east of the island. This harbour is protected by a spit of land once much larger than at present, which was submerged by an earthquake, with the greater part of the town of Port Royal upon it, in 1692. The seat of government was formerly *Spanish Town*, which lies a few miles inland. A railway extends from Kingston to Montego Bay, in the north-west, 113 miles distant, another to *Ewarton* on the mountains, and a third to *Port Antonio*, on the north-east coast, a distance of 54 miles. The roads in the island are fairly good, but liable to injury by floods. From an economic point of view Jamaica is much behind Cuba and Porto Rico, but it may be safely predicted that it

is destined to become prosperous in the near future as one of the fruit gardens for the United States, and as a winter resort for North Americans.

Turks and Caicos Islands, the most southerly of the Bahamas, are under the jurisdiction of Jamaica. They consist of about twenty islands and cays, forming two groups. The Turks Islands were so called from the prevalence of the turk's-head cactus, which gives a character to the barren soil. The most important of the group is Grand Turk, which is $6\frac{1}{2}$ miles long by 2 wide. In South Caicos the small town, *Cockburn Harbour*, is a port of entry, and there is another port on Salt Cay. Most of the black and coloured people are descended from the slaves of loyalist refugees who left the southern States during the American War of Independence. Up to late years these people have been living a half savage life, but latterly, by the introduction of sponge-fishing, salt-raking and the cultivation of sisal hemp, some progress has been made.

The Cayman Islands are also under the jurisdiction of Jamaica, from which they are distant about 180 miles to the west. Grand Cayman is 17 miles long by 7 broad, in some places rock-bound, and in others protected by coral reefs. The Morant Cays and Pedro Cays are small islands with a few inhabitants engaged in turtling and collecting guano.

DANISH WEST INDIES

Virgin Islands.—Immediately to the east of Porto Rico commences the line of the Lesser Antilles or Caribbees, which form a perfect bow with the convex part stretching into the Atlantic. The first group, going south, is that of the Virgin Islands, rising from the extensive bank which runs east from Porto Rico. Thirty-two of them belong to Great Britain and two to Denmark.

The Danish Islands are St. Thomas and St. John in the Virgin group, and St. Croix. They were once under cultivation to a considerable extent, but they are now almost bare, only covered with a scrubby vegetation consisting mainly of lantana, or sage bush, from amidst which the ruins of plantations can here and there be discerned. But although once largely supplied with plantations, their old prosperity was perhaps more due to the fact that when the other nations ruling the West Indies were at war, Denmark remained strictly neutral. **St.**

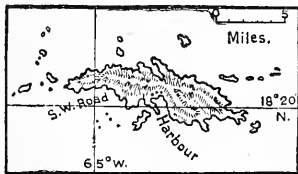


FIG. 379.—St. Thomas.

Thomas, with its commodious land-locked harbour, was a free port, and as such it reaped to the full its remarkable advantages of position. Pirates, privateers, men-of-war and merchant vessels of all nations met within its harbour in peace and safety, and obtained supplies from its traders. Of late years, however, St. Thomas has very much declined, and it is now little more than a port of call. The area of the island is 23 square miles, and its population 12,000, most of whom

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live in the capital, *Charlotte Amalie*, which is also the capital of the Danish West Indies. **St. John** has an area of 42 square miles, but a population of only 900. The island, in fact, is virtually ruined. **Santa Cruz** or **St. Croix**, is the largest of the Danish West Indies, with an area of 74 square miles. Once noted for its plantations, it has much diminished in the output of sugar, rum and molasses. The capital is *Christiansted*. Very little Danish is spoken either here or at **St. Thomas**, English being generally used; the **St. Thomas** negro, however, is noted for having a smattering of several languages, which is a necessity from the island being the resort of so many nationalities. It has often been rumoured that the United States were about to buy these islands.

DUTCH WEST INDIES

Dutch Antilles.—In the group south-east of the Virgin Islands are the small Dutch possessions of **Saba**, **St. Eustatius**, and **St. Martin's** (an island half of which belongs to France). These are included under one government with **Curaçao**, **Buen Ayre**, and **Aruba**, which are situated far away, off the coast of Venezuela. The whole have an area of 400 square miles and less than 50,000 inhabitants. **Saba** consists of a single volcanic cone rising 1,500 feet above the sea. Steps lead from the shore to a height of 800 feet, where, within the ancient crater, the settlement has long been established. The inhabitants, who number nearly 2,000, grow fruit and vegetables, which they sell to other islands, and they are also expert boat-builders and fishermen. In **St. Eustatius** also, the main part of the island is a volcanic cone, but there is a stretch of fertile land on the lower slopes. It was once, like **St. Thomas**, a depôt for privateering and smuggling adventurers, but it has now entirely lost its former trade. **St. Martin's** has been divided between France and Holland since the year 1648. The Dutch portion is at the south of the island, and contains an area of 17 square miles, with a population of nearly 4,000. A little sugar and salt are exported, but the colony is by no means flourishing.

Dutch Leeward Islands.—The principal group of Dutch islands lies far within the bow of the Antilles and about 40 miles from the coast of Venezuela. **Curaçao** is 36 miles long by 8 broad. Down to the end of the last century it was the chief depôt of the smuggling trade with Spanish America, and was largely cultivated to supply fresh provisions to the numerous traders calling there, but now it is much depressed. The chief product is salt, but a little sugar and tobacco are grown, as well as the fruit used in flavouring the well-known liqueur named after the island. The small town of *Willemstadt* is the capital and the seat of government for the whole of the Dutch West Indies. The administration is carried on by a Governor and Colonial Council, and each island has a chief, all of whom are appointed by the sovereign. *Willemstadt* stands on a very safe harbour, which can be easily secured from outside enemies. **Buen Ayre**, or **Bonaire**, and **Aruba** are smaller islands lying respectively to the east and to the west of **Curaçao**.

LEEWARD ISLANDS

British Leeward Islands.—This colony includes the **Virgin Islands** and the chain of British islands as far south as Dominica. It includes, amongst others of the Virgin Islands, Anegada, Virgin Gorda, Tortola, Joost van Dyke, Peter's Island and Salt Island, with an aggregate area of about 60 square miles. The chief town is *Road Town*, Tortola. A small quantity of sugar is grown, but the few inhabitants mostly live by growing provisions, raising cattle and fishing, their surplus produce being taken to St. Thomas. Antigua, with its dependencies Barbuda and Redonda, Dominica, Montserrat, St. Kitt's or St. Christopher's, Nevis, The Dogs, and several smaller islands, also belong to the "Leeward" colony. These islands were federated under one Governor and Legislative Council in 1871; and although so numerous, their total area is only 700 square miles. Structurally, they form the peaks of two parallel volcanic mountain chains, that to the west including Saba and St. Eustatius, St. Kitt's, Nevis, Redonda, and Montserrat, and that to the east Sombrero, Anguilla, St. Martin's, St. Barts or St. Bartholomew's, Barbuda, and Antigua.



FIG. 380.—Badge of the Leeward Islands.

Antigua is 28 miles long by 20 broad; its coast is deeply indented and broken into bays and peninsulas with high and rocky shores, in contrast to the usual uniform outline of these islands. The whole island is beautifully diversified by hill and dale, and the highest elevation, the Shackerley Mountains, reaches 1,500. The chief productions are sugar and pine-apples, and there are many small estates in cultivation. Little more than one-twentieth of the population are whites. The island was settled by the British in 1632, and except for a short French occupation it has since remained under the same flag. English is commonly spoken. The chief town is *St. John's*, well situated on English Harbour.

Barbuda and **Redonda** are dependencies of Antigua. Barbuda is very flat, with a large lagoon on its west side; its exports are salt and phosphates. Redonda is a narrow islet, only one mile long, but is valuable for its mines of phosphate of alumina, of which about 7,000 tons are annually exported.

Dominica, lying between the French islands of Guadeloupe and Martinique, is 29 miles long by 12 broad, with bold precipitous coasts and a picturesque mountainous interior. The loftiest summit, *Morne Diablotin*, is 5,314 feet high, and from the mountains many rushing torrents descend, which vary much in size according to the rainfall. There are several hot sulphur springs. Good anchorage can be obtained to leeward, but there are no harbours. *Roseau*, or *Charlotte Town*, is the capital; the only other town is *Portsmouth*, or *Prince Rupert's Town*. The colony was founded by the French, and a patois of that language is most commonly spoken. The Grand Soufrière is an active volcano, and in 1880 there was

an eruption which covered the houses of Roseau with ashes and scorïæ to a depth of two or three inches. The chief exports are coffee, cacao, sugar and lime-juice.

Montserrat is 11 miles long by 7 broad. It is so rugged and mountainous that only one-third of its small area can be cultivated, the remainder being covered with magnificent forests. The highest elevation is the Soufrière Hill, 3,000 feet. *Plymouth*, the chief town, stands on an open roadstead on the south-west coast and near the fertile part of the island. The chief product is sugar; lime-juice is also of some importance for export. In 1896 a great hurricane, earthquake and flood devastated the island. The English language is universally used, and the island is said to be the most healthy of the Antilles.

St. Kitt's, or St. Christopher's, 23 miles long by 5 broad, tapering in the south-east to a long narrow peninsula, consists of a single peak, Mount Misery, 3,700 feet high, with gentle slopes formed by old lava streams deeply furrowed by the floods of the rainy seasons. The slopes are very fertile, and the alternating forests and cane fields produce a most pleasing effect. There are hot springs in several places which emit sulphurous vapours. This is the oldest British settlement in the West Indies, having been founded in 1623; but on account of an amicable arrangement for its division between the British and French, it was for a long time a "bone of contention" between the two nationalities. The chief town is *Basseterre*, at the junction of the long peninsula with the main island. The chief products are sugar, molasses, and rum, arrowroot, coffee, cacao and tobacco.

Nevis is joined to St. Kitt's for administrative purposes, and is only separated naturally by a narrow strait. It is about eight miles in diameter, and consists of a single volcanic mountain rising from the sea to an elevation of 3,200 feet, with fertile land on the slopes. The only town is *Charlestown*, and its products are sugar and salt.

Anguilla is also included in the same administration. It is 16 miles long by 3 broad, its name meaning "eel," having reference to its long narrow and curved form. Its exports are phosphate of lime and salt, and there is a small

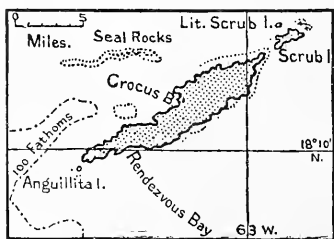


FIG. 381.—Anguilla.

town called *Rode Bay*. The small islands called The Dogs are dependencies of Anguilla.

FRENCH WEST INDIES

BY M. ZIMMERMANN.

The French West Indies.—The main group of the French West Indies occupies the portion of the Lesser Antilles between $14\frac{1}{2}$ and $16\frac{1}{2}$ ° N.; it includes the islands of Martinique, Guadeloupe, Marie Galante, and

Desirade of which only the two first are important ; and there are also the islands of St. Martin and St. Bartholomew in 18° N. These are all that remain to France of its flourishing West Indian settlements of the seventeenth century. **Guadeloupe** is composed of a volcanic island, Grande Terre, and a coral island, Basse Terre, united by a narrow isthmus, while **Martinique** is purely volcanic. Both are exposed to hurricanes and earthquakes, and the eruption of Mont Pelée on Martinique in 1902 wiped out the seaport town of *St. Pierre* and destroyed 30,000 people. Both islands are undergoing a serious economic crisis ; their former sources of wealth, sugar and rum, have been unable to compete with the products of the beet. The trade of Guadeloupe diminished by one-third between 1878 and 1898, and Martinique is no better off. Efforts have been made to restore prosperity by the cultivation of cacao, tobacco, and especially pineapples and bananas. The population is very dense on both islands ; the negroes and mulattoes have entirely taken the place of the old planters.

WINDWARD ISLANDS

British Windward Islands.—South of Martinique comes the federation of the Windward Islands, which includes St. Lucia, St. Vincent, Grenada, and the Grenadines. The total area of these islands slightly exceeds 500 square miles, and of their population less than five per cent. are whites.



FIG. 382.—*Badge of the Windward Islands*

St. Lucia is 24 miles long by 12 broad ; it is of volcanic formation, very picturesque from the fantastic shapes of the rocks. The soil is decomposed lava and very fertile. A volcanic crater with a fuming *soufrière* is among the sights of the island. The scenery is of peculiar beauty, and Castries on the north-west, with its two peaks 3,000 feet high, called the Pitons, can hardly be equalled in grandeur. The harbour

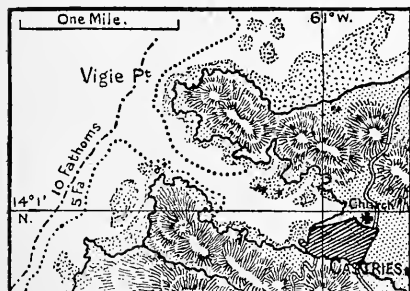


FIG. 383.—*Castries Harbour.*

of Castries is probably the finest in the West Indies, and has been adopted as a naval station. The people are mostly black and coloured, and speak a French patois similar to that of Dominica, but English is generally understood. The island was settled mainly by the French, but it was taken and given up again several times by the British before it finally came into their possession in 1803. *Castries*, on

its fine harbour, is the capital ; the town of *Soufrière* lies on a less important bay in the north-west. The exports are sugar, cacao, logwood and spices.

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St. Vincent is 18 miles long by 11 broad. A stretch of volcanic hills forms the backbone of the island, and extends here and there into spurs with rich valleys between them. The highest peak is the Morne à Garou, 4,000 feet ; the Soufrière, 3,000 feet, is an active volcano. In 1812 a most disastrous eruption took place, which utterly ruined the greater part of the cultivation, and in 1902 eruptions did immense damage. Between the two mountains there is a lake nearly a mile in diameter, occupying the crater of an extinct volcano, and without either inlet or outflow. In early times the island was left in the hands of the Caribs, and was afterwards alternately French and British. The Caribs were, however, so troublesome to the settlers that in 1796 the British authorities deported them, to the number of 5,000, to the island of Rattan, off the coast of Honduras. The chief exports are sugar, rum, cacao, spices and arrowroot. The capital, *Kingstown*, is situated on an extensive harbour in the south-west.

The **Grenadines**, a line of small islands, extends between St. Vincent and Grenada. Bequia belongs to St. Vincent, and is long and narrow, with an area of six square miles ; being badly watered, however, it is not favourable to settlement. Carriacou, Union, and Mustique belong to Grenada.

Grenada is 21 miles long and 12 broad, rugged and picturesque in scenery, and traversed from north to south by an irregular mass of volcanic mountains, the highest, Mount St. Catherine, rising to 2,750 feet. The island contains several small but picturesque crater lakes. The soil is a dark mould, very fertile, especially in the valleys. Unlike the other islands, it has ceased to grow sugar, which has been replaced by cacao, which forms a valuable export, as well as coffee, kola and spices ; the colony has been called "The Spice Island of the West." Fruit and vegetables are also grown for the markets of Barbados and Trinidad. Grenada was ceded to Great Britain in 1783, after being in the hands of the French for over a century, and the Creole patois is commonly spoken. Of the population much less than one per cent. are whites. *St. George's*, the capital, stands on a fine harbour in the south-west.

BARBADOS

Barbados, the most easterly of the West Indies, is 21 miles long by 14 broad, and lies 100 miles east of St. Vincent. It was partly federated with the Windward Islands until 1885, when it was entirely separated, and is now a distinct colony. The island is lower than most of the others, the highest elevation being only 1,145 feet. Surrounded by coral reefs, its formation is Tertiary sandstone and limestone, probably raised by volcanic agency. A kind of bitumen called *manjak* is now being mined and utilised, and a crude petroleum known as Barbados tar has long been collected and used as a medicine. There are numerous springs, some of which are impregnated with mineral substances, but no rivers. The soil is so fertile and so free from rocks that there is very little waste land in

the island. It was first settled by the British in 1625, and it enjoys the unique position of having never been in the possession of any other nation. The whites once preponderated, and by them Virginia and Jamaica were largely colonised. At present only about 10 per cent. of the inhabitants are white. The density of population, 1,120 per square mile, is perhaps unique for any separately governed colony or State. Barbados has never experienced the difficulty so conspicuous in the other colonies of want of labour; even the emancipation caused but little distress. Sugar has always been the staple product, and now that the price is so low the island is passing through a period of depression hardly known before. The English language is universally spoken, and the Barbadian is proud of his connection with the mother country. His island is "Little England," and he is "neither Carib nor Creole, but true Barbadian born." The constitution is old and on the lines of the mother country; the Governor represents the King, the Legislative Council the Lords, and the House of Assembly the Commons. *Bridgetown*, the capital, stands on the shore of an open roadstead named Carlisle Bay, in the south-west, and a railway runs thence round the south and east of the island.

TRINIDAD

Trinidad is only separated from the continent by narrow straits, and physically belongs to South America rather than to the West Indies, its mountains being the continuation of the Venezuelan system. Next to Jamaica it is the largest of the British West Indian Islands, being 48 miles long by 35 broad. It is generally level, but three chains of hills run across it from east to west; that in the north, the termination of the Venezuelan Coast Range, is the highest, reaching a maximum of about 3,000 feet. The most re-

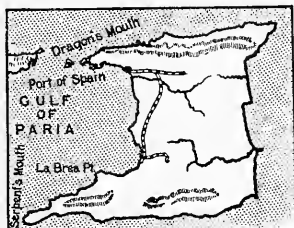


FIG. 384.—Trinidad.



FIG. 385.—Badge of Trinidad.

markable feature is the Pitch Lake at La Brea, in the south-west, which was known from a very early period, for even the buccaneers caulked their ships with its asphalt or bitumen. The lake covers about ninety acres, and its product is a valuable article of export, being largely used for pavements.

The climate is hot and damp, but agreeable, the soil fertile and capable of growing all tropical products. The forest, which covers a large part of the island, is valuable for its timbers, and, like that of the neighbouring mainland, is very interesting botanically. The island was discovered by Columbus in 1498, and was colonised to a small extent by the Spaniards, who continued to possess it till 1797, when it was con-

quered by Great Britain. Remnants of Spanish laws still exist, and the Spanish language is spoken to some extent; but on account of a French immigration, which took place in 1783 and following years, the Creole French patois is more prevalent. English is, however, generally understood. Together with the island of Tobago it forms a Crown colony; it is administered by a Governor, Executive Council, and Legislative Council. The inhabitants consist of black and coloured people, with a small proportion of whites, East Indians who have been imported as labourers to the great benefit of the colony, and a few Chinese.

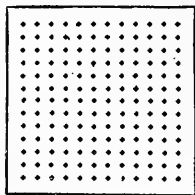


FIG. 386.—Average population of a square mile of Trinidad.

The chief products are sugar, cacao, and asphalt, and, like the other sugar colonies, it is much depressed at present from the low price of its staple; less so than others, however, for Trinidad cacao is an exceedingly valuable product. There are about eighty miles of railway open on the island connecting *Port of Spain*, the capital, in the north-west, with *San Fernando*, in the south-west, and with the interior.

Tobago lies about 20 miles north-east of Trinidad, and is 26 miles long by $7\frac{1}{2}$ broad. Its formation is volcanic, with conical hills and ridges rising to a height of 1,800 feet. It exports sugar, coco-nuts and live stock from the little town of *Scarborough*, on the south coast.

STATISTICS OF BRITISH WEST INDIES.

Colony.	Bahamas.	Jamaica and Turks Islands.	Leeward Islands.	Windward Islands.	Barbados.	Trinidad and Tobago.
Area, square miles ..	4,466 ..	4,372 ..	704 ..	509 ..	166 ..	1,868
Population, 1881 ..	43,521 ..	585,536 ..	122,046 ..	121,502 ..	171,860 ..	171,179
" 1891 ..	47,595 ..	644,235 ..	127,723 ..	136,483 ..	182,306 ..	200,028
" 1901 ..	54,358 ..	771,900 ..	127,440 ..	162,800 ..	195,600 ..	279,700
Density of pop. 1901	12 ..	177 ..	181 ..	320 ..	1,180 ..	150
Annual exports :—						
Average, 1871-75 ..	135,000 ..	1,364,000 ..	482,000 ..	539,000 ..	1,193,000 ..	1,613,000
" 1881-85 ..	145,000 ..	1,445,000 ..	545,000 ..	508,000 ..	1,159,000 ..	2,503,000
" 1891-95 ..	127,000 ..	1,896,000 ..	457,000 ..	515,000 ..	911,000 ..	2,157,000
Annual imports :—						
Average, 1871-75 ..	203,000 ..	1,654,000 ..	430,000 ..	419,000 ..	1,149,000 ..	1,381,000
" 1881-85 ..	207,000 ..	1,500,000 ..	403,000 ..	407,000 ..	1,097,000 ..	2,566,000
" 1891-95 ..	185,000 ..	2,094,000 ..	442,000 ..	446,000 ..	1,151,000 ..	2,195,000

PRINCIPAL TOWNS.

Town.	Colony.	Population, 1881.	Population, 1891
Nassau	Bahamas ..	ca. 5,000 ..	ca. 5,000
Kingston	Jamaica ..	38,566 ..	48,504
St. John, Antigua ..	Leeward Islands ..	ca. 10,000 ..	9,738
St. George's, Grenada ..	Windward Islands ..	ca. 5,000 ..	ca. 5,000
Bridgetown	Barbados ..	20,947 ..	21,000
Port of Spain	Trinidad ..	31,858 ..	33,273

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QUESTIONS AND EXERCISES

ON

NORTH AMERICA, CENTRAL AMERICA, AND THE WEST INDIES

(Pp. 664-812)

AND

MISCELLANEOUS QUESTIONS AND EXERCISES SELECTED FROM THE PRELIMINARY CERTIFICATE, KING'S SCHOLARSHIP, AND OXFORD AND CAMBRIDGE JUNIOR AND SENIOR LOCAL EXAMINATION PAPERS.

NORTH AMERICA, CENTRAL AMERICA, AND THE WEST INDIES

THE CONTINENT OF NORTH AMERICA (pp. 664-678)

1. Enumerate the resemblances that occur to you after comparing North and South America.
2. In what ways may contrasts be drawn between the two Americas? Make some comparison between North America and Eurasia.
3. Describe, briefly, the chief features of the west coast of North America.
4. What distinct types of land-forms are shown in the West Indies?
5. Where are the Laurentian Highlands? Give a succinct account of their structure and surface.
6. By what other name is the Alleghany Plateau known? Describe its position and characteristics.
7. Describe the Rocky Mountains under the following heads:—(a) Extent ; (b) various ranges ; (c) chief heights.
8. What do you know of the Great Plains of North America?
9. How do you explain the moderate difference of the opposite seasons along the Pacific coast, and the great contrasts in the interior and along the middle Atlantic borders?
10. Compare the temperature and rainfall of San Francisco and New York.
11. Study the map on p. 676 of the Mean Annual Rainfall of North America, and write down the results of your observation.
12. What do you know of the discovery of North America before Columbus?
13. Give some reasons that will account for the rapidity with which North America has been turned to the uses of civilisation.

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COLONIAL NORTH AMERICA

I. THE DOMINION OF CANADA (pp. 679-704)

14. What is meant by British North America? Give its boundaries and extent.
15. What do you know about the Gulf of St. Lawrence and Hudson Bay?
16. Name the four physical divisions of British North America, and explain their position.
17. Classify the rivers of British North America according to the four drainage areas.
18. "In so extensive a region the climate necessarily exhibits great diversities." Show the truth of this statement with regard to British North America, and name the climatic areas.
19. Where is the forest land of British North America, and what are the chief trees?
20. Explain the changes in the nature of the chief exports from Canada during the last hundred years.
21. Name and describe some of the chief Indian tribes of British North America. Give some facts with regard to the races of the people of Canada.
22. What do you consider are the chief means of internal communication in Canada?
23. Explain exactly what is meant by the "Dominion of Canada," and how each province is governed.

Nova Scotia

24. Where and what is Nova Scotia? Describe its coasts.
25. What do you know of the (a) surface, (b) climate, and (c) people of Nova Scotia?

Prince Edward Island

26. Describe the resources of Prince Edward Island.
27. What are the industries of the people?

New Brunswick

28. Mention the chief facts with regard to the position and surface of New Brunswick.
29. What are some of the rivers? Describe the resources of this province.

Quebec

30. Where is the province of Quebec situated, and what are its boundaries?
31. What are the three natural divisions of Quebec? Describe the St. Lawrence Plain.
32. "The climate is continental." Show that this statement is true with regard to Quebec.
33. When and by whom was Quebec discovered? What are the leading events in its history since that date?
34. Enumerate the chief vegetable and mineral products of the province of Quebec.
35. Draw a sketch map of Quebec province, and mark the position of the chief towns.
36. Describe fully the cities of Quebec and Montreal, making special reference to their position, their industries, and their people.

Ontario

37. What are the boundaries of Ontario, and what is the position of the Great Lakes with regard to this province?
38. Name the four natural divisions of Ontario, and give a brief characteristic description of each.
39. When was Ontario (*a*) first settled and (*b*) first erected into a province?
40. What are the chief crops of Ontario, and how are the people mainly occupied?
41. Name the chief minerals, and say where they are found.
42. Locate and describe Ottawa, Toronto, Hamilton, London, and Kingston.

Manitoba

43. Where is Manitoba, and what are the principal divisions?
44. Describe the Winnipeg River and the Red River.
45. What name was originally given to this province? Relate what you know of its present population and their industries.

British Columbia

46. Describe the position of this province, including Vancouver Island.
47. "British Columbia is essentially a land of mountains." Comment on this statement.
48. What do you know of the rivers and lakes of this province?
49. When and by whom was this province discovered? Give the chief subsequent events in its history.
50. Explain how the wealth of this province depends on the mineral products. Mention the other products, and show their importance.
51. Where and what are Victoria, Vancouver, Banff, and Rossland?
52. Make a sketch map of British Columbia showing the railways.

The Territories

53. Give the names of the other provinces and explain their relative positions.
54. What do you know of the surface and production of this area?
55. Where and what are the Saskatchewan River, Regina, Calgary, Dawson, and Klondike?

2. NEWFOUNDLAND (pp. 704-707)

56. Define clearly the position of the colony of Newfoundland, and describe its surface both on the island and the mainland.
57. What are some of the characteristics of its climate?
58. State what you know of the resources and industries of this colony.
59. When and by whom was Newfoundland discovered? Give the chief facts in its subsequent history.
60. What do you know of the means of communication?
61. Draw a sketch map of Newfoundland, mark the chief bays, locate St. John's, and indicate the position of the Banks.

3. ST. PIERRE AND MIQUELON (pp. 707-708)

62. Give a short account of the position and value of these islands.

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4. BERMUDA (pp. 708-709)

63. What is there remarkable about the situation and formation of these islands?
64. Give some facts of interest with regard to the climate and productions.
65. Who discovered these islands? How are they governed? Explain their value to Great Britain.

THE UNITED STATES OF AMERICA (pp. 710-773)

I. HISTORICAL AND POLITICAL GEOGRAPHY

66. Mention some of the chief landmarks in the discovery and settlement of the United States.
67. Draw the map on p. 711, and mark on it (a) the original States, and (b) States acquired by purchase or conquest.
68. What do you know of the boundaries of the various States, and compare the importance of some of the State capitals with that of some large commercial cities?
69. How are the individual States governed, and what are the main features in the government of the Union?
70. What remarks can you make on the influx of foreigners? Where has the process of rapid assimilation of foreigners been a success, and where a failure?
71. In what way has education been advanced in the United States by (a) wealthy men, and (b) by the Government?
72. At what seaports is the foreign trade of the United States carried on? Compare the value of the imports and exports.

2. REGIONAL GEOGRAPHY

73. How were the Appalachian Mountains first formed? What connection is there between their geological history and their present form?
74. Study carefully the map on p. 719, and then write out from memory the chief physical divisions of the United States, with their approximate positions.
75. Name the most important commercial cities of the Atlantic coastal plain, and describe their situation.
76. What examples of geographical control can you give on the New England coast?
77. Locate and describe Boston, Newport, Portland, Augusta, Portsmouth.
78. Make a list of the New England States, and enumerate their chief products.
79. "The imprint of glacial action is strong in New England." Discuss briefly the truth of this statement.
80. How do you account for the vast manufacturing industries of New England? What effect has water-power had in the forming of the towns?
81. Find the following places on the map, and mention one or two facts about each: Worcester, Waterbury, Nantucket, Provincetown, Plymouth.
82. Study the positions of New York, Philadelphia, and Baltimore, and then write down the reasons to which you think they owe their growth.
83. Say what you can of the Hudson River with regard to (a) its appearance, (b) its volume, and (c) its navigability.
84. Make a rough plan of the site of New York City, and explain the reason of its great extent from south to north.
85. Trace the progress of Philadelphia, and show in what ways it has been specially favoured.
86. Describe Baltimore, especially noting any advantages it possesses by virtue of its position.

Questions and Exercises

v

87. Where and what are Washington, D.C., Catskill Mountains, Adirondacks, Mount Marcy, and Wisconsin?
88. In what ways is the Ohio region one of the most valuable parts of the United States?
89. How would you explain the physical features of the Ohio region?
90. Trace the northern international boundary, and distinguish the natural and artificial parts of it.
91. To what do you attribute the growth of Cincinnati? Name the chief cities that have been built on the southern side of the Great Lakes.
92. How do the soil and surface of the prairies north of the Ohio differ from those farther south?
93. What are the chief crops and industries of the region from Ohio to Nebraska?
94. In what ways has glacial action affected the drainage of the district between Ohio and Nebraska.
95. "Chicago is the epitome of the prairie and lake region." Comment on this statement. Make some remarks on the site and growth of Chicago.
96. How can you associate the history of the Niagara River, the Great Lakes, and the city of Chicago?
97. Trace the course of the Mississippi River, and on a sketch map mark the position of the chief towns.
98. Describe the resources of the country through which the Ohio River flows, and give some facts as to the climate of this region.
99. How can it be said that the Southern Coastal Plain was chiefly responsible for slavery?
100. Draw a sketch map to show the old slave States and the present distribution of the coloured population.
101. Write some notes on Florida, with reference to (a) its position, (b) climate, and (c) productions.
102. Illustrate, by a map, the formation of the Mississippi delta.
103. What has been done to utilise the rich soil of this delta?
104. Where, in the Mississippi Basin, are tornadoes frequent? What are some of their characteristics?
105. Describe the Missouri Highlands and the Arkansas Highlands.
106. Write what you know of the Red River Rafts.
107. Read carefully the account of the Great Plains on pp. 755-757, and then write out from memory a résumé of the same.
108. Locate the Black Hills, the Bad Lands, the Sand Hills, the Plains of Kansas, and the Llano Estacado.
109. Which is the only important city on the Great Plains? Account for its successful growth.
110. Draw a map of the western half of the United States, and mark the Rocky Mountains, the Yellowstone Park, the Colorado Plateaux, and the Columbia Plateaux.
111. Describe the Yellowstone Park and the Colorado Canyon, with special reference to their size and natural features.
112. What are the classes of settlements in the Basin Range regions? What are the productions and industries of this region.
113. Name the chief mountain ranges in the Pacific Slope, and give the heights of some of the highest peaks.
114. Mention the chief stages in the growth of California.
115. Discuss the advantages and disadvantages of the presence of Chinese in the Western States.
116. Describe Alaska under the following heads: (a) surface, (b) rivers, (c) climate, and (d) economic products.
117. Why is the possession of Alaska of special interest to the United States?

MEXICO (pp. 774-781)

118. What do you know of the boundary line (*a*) between Mexico and the United States, and (*b*) between Mexico and Guatemala?

119. Give a brief account of the configuration of Mexico, and name six of the highest volcanoes.

120. Why has the city of Mexico the highest death-rate of any city in the civilised world? What has been done to improve its drainage system?

121. Describe the climate and rainfall of Mexico. How do you explain the fact that the conditions of rainfall have been modified since the period of the Spanish conquest?

122. What do you consider the characteristics of the fauna and flora of Mexico?

123. Write down the chief facts in the history of Mexico from its conquest in 1521 to the establishment of the Republic in 1867. How is Mexico now governed?

124. What are the mineral resources of Mexico, and what are the chief industries?

125. Give an interesting account of the city of Mexico, and name the chief sea-ports or harbours of Mexico.

CENTRAL AMERICA (pp. 782-790)

126. Draw a sketch map of Central America, and mark on it the Republics and British Honduras.

127. What do you know of the volcanoes and earthquakes of Central America?

128. Where is the watershed of Central America? Name the chief rivers and lakes.

129. In what ways do the mountains of Central America influence its climate and rainfall?

130. Give a few particulars of the vegetation and animal life of Central America.

131. Name some of the races that are represented in the Central American Republics. When were the separate Republics first formed, and what is their present form of government?

132. What are the mineral and agricultural productions of Central America, and what are the chief exports?

133. Locate and describe the chief seaports of the various Republics, and comment on the means of communication.

134. Describe British Honduras with regard to its (*a*) position, (*b*) coast, (*c*) surface, (*d*) productions, and (*e*) government.

135. Discuss the relative advantages of a ship canal across the isthmus of Panama, and of one through Lake Nicaragua.

THE WEST INDIES (pp. 791-812)

I. GENERAL FEATURES (pp. 791-793)

136. What is the position of the West Indian Islands? What European nations hold these islands?

137. Explain how the islands differ (*a*) in size, and (*b*) in geological structure.

138. Give a general account of the climate and soil of the West Indies.

139. What do you consider were the evils and the advantages of the system of negro slavery?

140. How would you explain such a statement as this :—"The future of the West Indies is bound up with the future of cane sugar."

2. CUBA (pp. 793-798)

141. Examine a map of Cuba, and then describe its coast-line. Draw a plan of the harbour of Havana.

142. Describe Cuba under the following heads : (a) surface, (b) climate, and (c) flora and fauna.

143. What do you know of the early history of Cuba? Describe its present government, religion, and state of education.

144. Make a list of the chief products of the island, and arrange them in order of importance.

145. What are the essentials of Cuban commerce? Give some facts relating to its trade with the United States.

3. PORTO RICO (pp. 798-801)

146. Give a short account of (a) the configuration, (b) climate, and (c) resources of Porto Rico.

147. What is the present government of Porto Rico, and what is the condition of education in the island?

4. HAITI AND SANTO DOMINGO (pp. 801-802)

148. What are the physical features of Haïti, and what are the chief productions?

149. Write a brief account of the history of the island, and describe its present government.

150. Where and what are San Domingo, Puerto Plata, Port-au-Prince, Gonave, and Tortuga?

5. THE WEST INDIAN COLONIES (pp. 803-812)

The Bahamas

151. Where are the Bahamas? Name the most important islands and give the chief productions.

152. What do you know of the people of these islands and their industries?

Jamaica

153. Write a description of the position, surface, and productions of Jamaica.

154. When was Jamaica first settled by the Spaniards and conquered by the British? What has been its subsequent history?

155. What do you know of Kingston, Spanish Town, Port Antonio, Turks and Caicos Islands, and the Cayman Islands?

156. Explain the importance of the fruit trade to Jamaica.

Danish and Dutch West Indies

157. Name the islands in the West Indies that respectively belong to Denmark and Holland.

158. What are the productions of these islands? How is the government administered?

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Leeward Islands

159. What islands are included in this group? What do you know of their structure?
160. When were these islands acquired by Britain? How are they governed?
161. Give the capital of each island, and describe the productions of the islands.

French West Indies

162. What islands do the French hold? In what way are these islands undergoing a severe economic crisis?

Windward Islands

163. Name the British Windward Islands, and describe the surface of St. Lucia and St. Vincent.
164. What do you know of the inhabitants of these islands and of their industries?

Barbados

165. Where is Barbados? When was it made a distinct colony?
166. What do you know of the productions, people, and government of Barbados?

Trinidad

167. Draw a map of Trinidad, and show its position with regard to South America.
168. Write a short account of Trinidad, giving particulars of its surface, productions, and people.

QUESTIONS AND EXERCISES SELECTED FROM EXAMINATION PAPERS

THE PRELIMINARY CERTIFICATE AND KING'S SCHOLARSHIP

169. Describe as fully as you can Jamaica. (1900)
170. Describe a journey from Liverpool across Canada to Japan. (1900)
171. Describe the position and explain the importance of Chicago and Winnipeg. (1900)
172. Give a short account of Yellowstone Park and Great Salt Lake. (1901)
173. Describe fully Newfoundland. (1901)
174. The geography of British North America is being studied by children whose average age is about eleven years. What cities should they remember by name? Give your reasons for the selection which you make. (1902)
175. Describe the frontier of the United States. Name the races that inhabit the districts north of the northern frontier and south of the southern frontier. Compare their population with that of the British Isles and Canada. (1902)
176. Describe shortly the Canadian Pacific Railway. Give a rough sketch map, and show the position of at least four places, including two termini. (1902)
177. Name in order of importance the provinces of the Dominion of Canada. How is the Dominion governed (*a*) as a whole, (*b*) in its various divisions. (1904)

178. On a sketch map of North America indicate—

- (a) The various independent countries ;
- (b) The main physical features ;
- (c) Where the frontiers follow *natural*, and where *political* lines ;
- (d) The climatic conditions.

[Use any method you like to show them].

(1907)

OXFORD JUNIOR AND SENIOR LOCALS

179. Give a description of the route taken by the Canadian Pacific Railway, mentioning the chief stations. Show in what way it is of service to trade. (1903)

180. How do you account for (a) the large rainfall in British Columbia, (b) the fogs off the banks of Newfoundland? (1904)

181. Describe the distribution of lakes and rivers in Canada, and explain the causes which give the necessary supply of water. What is the effect of the great lakes on the climate of Canada? (1904)

182. Discuss the advantages and disadvantages of the various alternative routes by which it has been proposed to connect the Atlantic and Pacific Ocean by canal. (1904)

183. Describe the two great inland waterways of North America. (1905)

184. Describe fully the waterway leading from New York to Lake Superior, and give some account of the trade carried on by means of it. (1906)

185. In what parts of North America are people of French and Spanish descent chiefly found? How do you account for their presence? (1906)

186. Describe accurately the position of San Francisco. What geographical conditions first gave rise to the growth of San Francisco? How do they differ from the conditions that now cause its prosperity? (1906)

187. Describe shortly the climate of Nova Scotia. Compare it with that of England, and give reasons for the differences you point out. (1906)

CAMBRIDGE JUNIOR AND SENIOR LOCALS

188. Describe California, and give an account of its climate and chief agricultural, forest, and mineral products. Name and describe the situation of its chief seaport. (1903)

189. Name the capital and the chief seaport of Mexico, describe their situations, and the character of the country traversed by the railway connecting these two places. (1903)

190. In what parts of North America are the following chiefly found: coal, copper, petroleum, timber, cattle, sheep? (1903)

191. What are the chief manufactures of Canada, and where are they carried on? (1903)

192. In the case of the *West Indies*, say why these islands are so named, to whom they belong, which are most thickly peopled, and what are the chief products of the principal islands. (1903)

193. Give an account of the Arid Region of the United States, the reasons why it is arid, its position, extent, most striking features, and chief products. (1903)



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